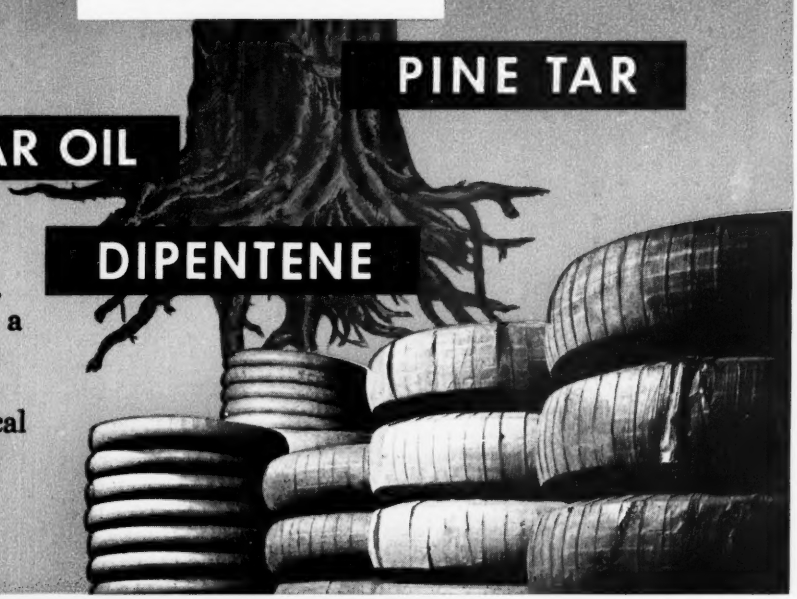
INDIA RUBBER WORLD

OUR 61st YEAR

A BILL BROTHERS PUBLICATION

JULY, 1950



For high hot tensile, experts say—
Make rubber stocks with **Philblack* A!**

Hang it all, what can you tell by a picture? We wish you could really see this marvelous performer in action! High hot tensile! Exceptionally good stress-strain properties even at elevated temperatures. And Philblack A scores over channel black again and again for longer flex life . . . lower heat buildup . . . better compression set . . . and higher resilience!

To decrease costs and, at the same time, improve processing characteristics . . . use Philblack A. Use it in both natural and synthetic stocks.

PHILLIPS CHEMICAL COMPANY

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EVANS BUILDING · AKRON 8, OHIO

Warehouses in Akron, Boston, Chicago and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

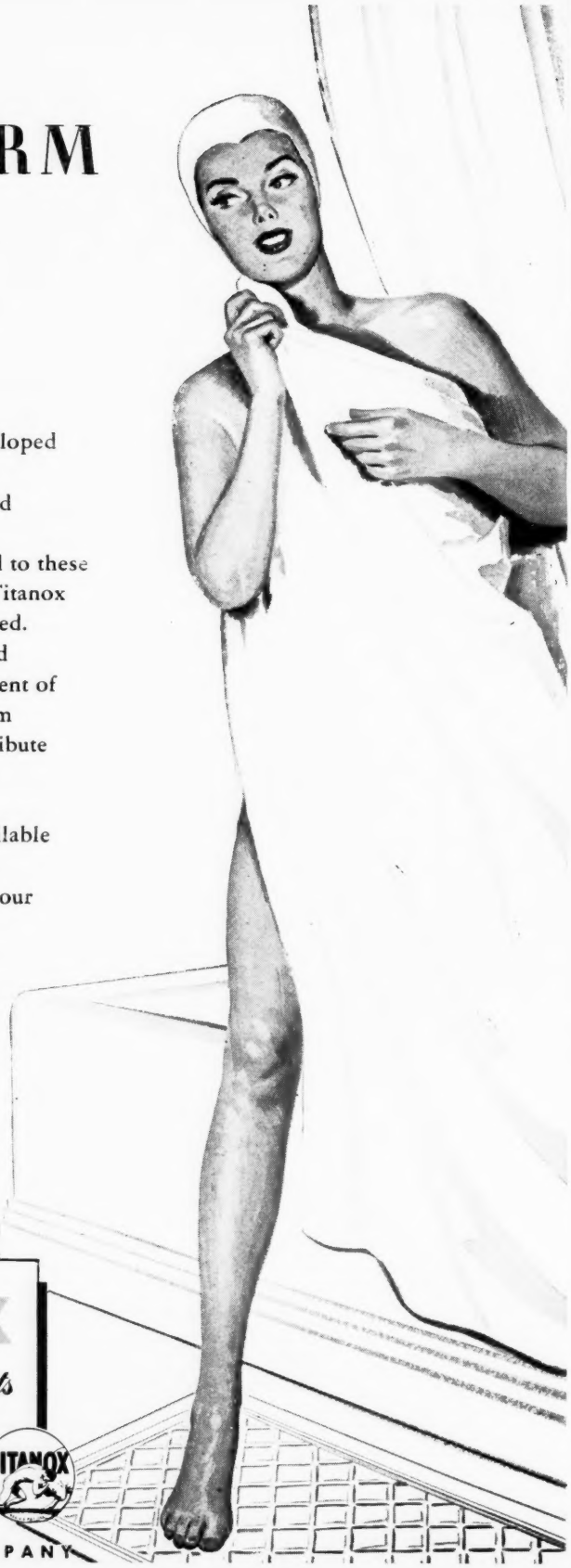
*A Trademark

Bright WARM and MODERN

MODERN rubber technology has recently developed a warm suede-like finish for rubber shower curtains and bathmats that banishes forever the cold clammy clasp of wet rubber.

Outstanding brightness and opacity are imparted to these products—like so many other modern articles by Titanox pigments, whether whiteness or soft tints are desired. For the more heavily loaded stocks such as are used in bathmats, TITANOX-RCHT is the titanium pigment of choice. All Titanox pigments whether pure titanium dioxide or titanium dioxide-calcium sulphate contribute superior pigment properties economically and are compatible with all types of rubber.

Our Technical Service Department is always available for consultations on your pigmentation problems with all kinds of rubber products. Write or phone our nearest office. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; 104 South Michigan Avenue, Chicago 3, Ill.; 2600 South Eastern Avenue, Los Angeles 22, Calif. Branches in all other principal cities.



8219

® TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

Shoe sole makers:

Let's talk "processability"

in reinforcing resins

PLIOLITE S-6B

USE PROVED Products

RECENTLY, you've probably heard a lot of claims about "easy processing" in reinforcing resins. We have, too; and now, after an extensive study, we can give you our answer. The accompanying chart gives an excellent summary of our results which add up to the fact that **Pliolite S-6B** is the easy processing resin to end all claims for this property.

Please remember we're not making idle conversation or postulating unproved theories. Our statement is based on cold, hard facts—backed up by actual laboratory results. We did not make a superficial examination; but, rather, delved into every aspect of processability as thoroughly as possible.

Among the studies we conducted were the following:

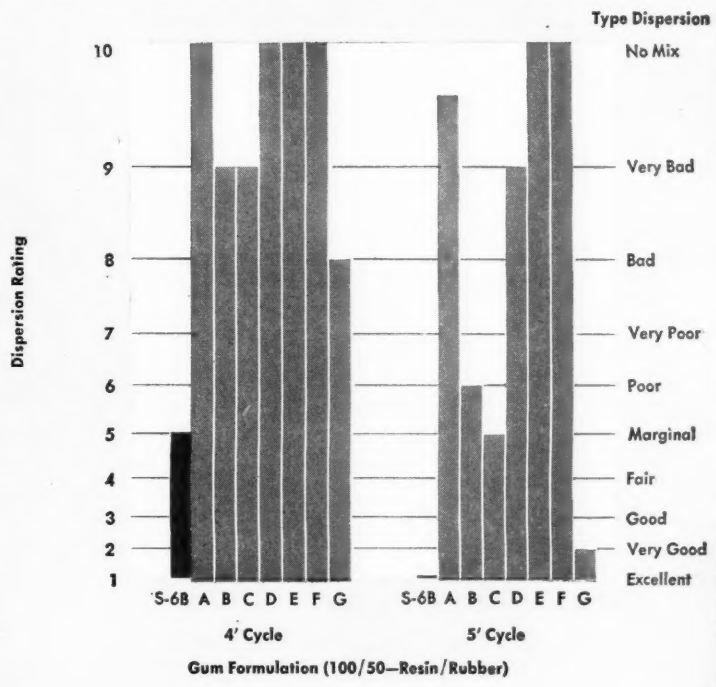
1. Effect of Resin Particle Size
2. Effect of Type of Resin Particle
3. Effect of Resin Flow Characteristics
4. Effect of Resin Softening Point
5. Effect of Banbury Temperatures
6. Effect of Banbury Cycle

In addition to these studies, full physical evaluations in typical sole stocks were conducted on all the resins investigated to make certain that easy processing was not obtained through a sacrifice of reinforcing properties.

As a result of our work, we came to the definite conclusion that the resin which we now market as **Pliolite S-6B** is the best easy processing and reinforcing resin on the market. Once you've tried this new resin, we think you'll agree with our findings. So, why not write today for full details and samples of **Pliolite S-6B**, the truly easy processing resin that will give you better shoe soles? Write to:

Goodyear, Chemical Division
Akron 16, Ohio

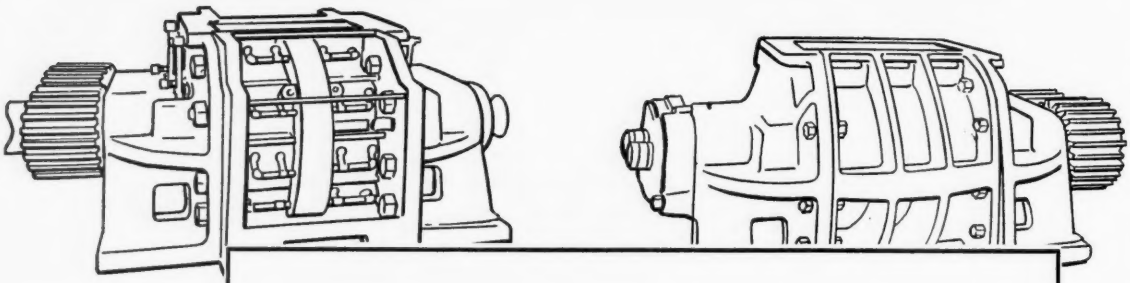
Dispersion Rating of Pliolite S-6B vs. Commercial Resins



Proof of processability that's outstanding. Dispersion ratings were made after visual examination of mill tailings sheeted out to 0.10". Masterbatching was accomplished in laboratory Banbury at 30 r.p.m. with 100°F water on shell and rotor. Batch discharge temperatures for both 4' and 5' cycles ranged from 200°F-218°F. Note that the superior processability of **Pliolite S-6B** is clearly defined.

Pliolite—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR



REBUILT BANBURY BODIES
READY FOR QUICK SHIPMENT

WE HAVE READY FOR QUICK DELIVERY TWO #9 BANBURY BODIES, SPRAY TYPE, WITH DOOR AND CYLINDER;— ALSO ONE 3A BODY. ALL COMPLETELY REBUILT, AND CARRYING OUR ABSOLUTE GUARANTEE. WILL SELL OUTRIGHT OR EXCHANGE FOR WORN BODIES. WIRE YOUR RESERVATIONS.

Faster BANBURY REBUILDING SERVICE SAVES MANY $ IN PLANT COSTS

IF YOUR BANBURY is "limping" just give us a call.

Our production facilities have been greatly expanded, and we can give you remarkably quick service on completely rebuilding and hard-surfacing any size body, with every part restored to original dimensions, and efficiency.

On some sizes we are prepared to interchange with you almost immediately.

We guarantee every job. Interstate rebuilt Banburys are performing with perfect satisfaction in plants all over the United States. Our record in the past 16 years speaks more eloquently than words.

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Call, wire, or write us now, for a cost estimate. Time saved is money earned. Let us date you up for our "Pre-Plan" Banbury Rebuilding and Repairing Service.

FREE To Banbury Owners

To demonstrate the unequaled abrasion-resistant material we use in hard-surfacing rotors, rings, and mixing chamber, we will send FREE to any Banbury owner a unique tool you can make very useful in home or office. Just request on your company letterhead.

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for lower power consumption on highly loaded stocks.....

Marbon "8000"

Count the savings on your power bills due to the heat plasticizing action of MARBON "8000" during mixing operations.

Observe these additional economies:

— Reduced scrap and seconds because of better moldability—Less sales resistance because of better appearance —

All this plus improved physical properties of your finished product makes MARBON "8000" an economical compounding ingredient.

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Kosmos 50 is a furnace process oil-base black of FEF (fast extruding) type. It is quick curing, stro reinforcing, and resistant to abrasion.

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Charleston 27, West Virginia

Purecal U Doubles Tear Resistance

And that's only one of the three big advantages of Wyandotte's rubber extender — ***Purecal* U.*** At the same moduli, tensile strength, elongation and hardness, Wyandotte's Purecal U will *double* tear resistance.

Advantage No. 2. Purecal U added to pure gum decreases curing time by 75%.

Advantage No. 3. Purecal U decreases compound cost.

Because Purecal U is *white* you can obtain any color you wish in the finished article.

Wyandotte Purecal U is the most uniform calcium carbonate made. It is produced by the reaction of crystal-clear solutions of calcium chloride and sodium carbonate. Wyandotte's close control of this reaction makes it possible to produce ultra-fine precipitates of uniform particle size.

There's a brand-new booklet, "PURECAL IN NATURAL RUBBER," that contains the full story on Wyandotte's three grades of Purecal and what they can do for you. Why not write for it?

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CHLORINE • HYDROGEN • DRY ICE
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Wyandotte
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Methocel:

the Excellent Emulsion Stabilizer

The rubber industry has found a practical use for Methocel (Dow Methylcellulose) as a stabilizing and thickening agent for control of viscosity in latices. The lower viscosity types of Methocel facilitate a rapid and economical thickening. Methocel, in the higher viscosity types, has been used for the creaming of latices, where it produces the creaming effect readily. Methocel is compatible with most latices, has high uniformity and purity and is not subject to spoilage.

Methocel is also valuable as a mold release for certain types of molded rubber goods. It is impervious to most organic materials and is unaffected by solvents, rubber accelerators or anti-oxidants. Methocel forms a smooth, tough, continuous film on the mold face and will not soften or become tacky with heat.

Have you investigated the *new* Methocel, *powdered?* Write or phone us for further information about Methocel applications in the rubber industry. Send for your free experimental sample of the *new* METHOCEL, *powdered.*

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

THE new *Methocel*

DID YOU GET YOUR SAMPLE?

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Please send free sample of METHOCEL, for use in_____
Check viscosity desired: 15, 25, 100, 400, 1500, 4000 cps.

Name and Title_____

Firm_____

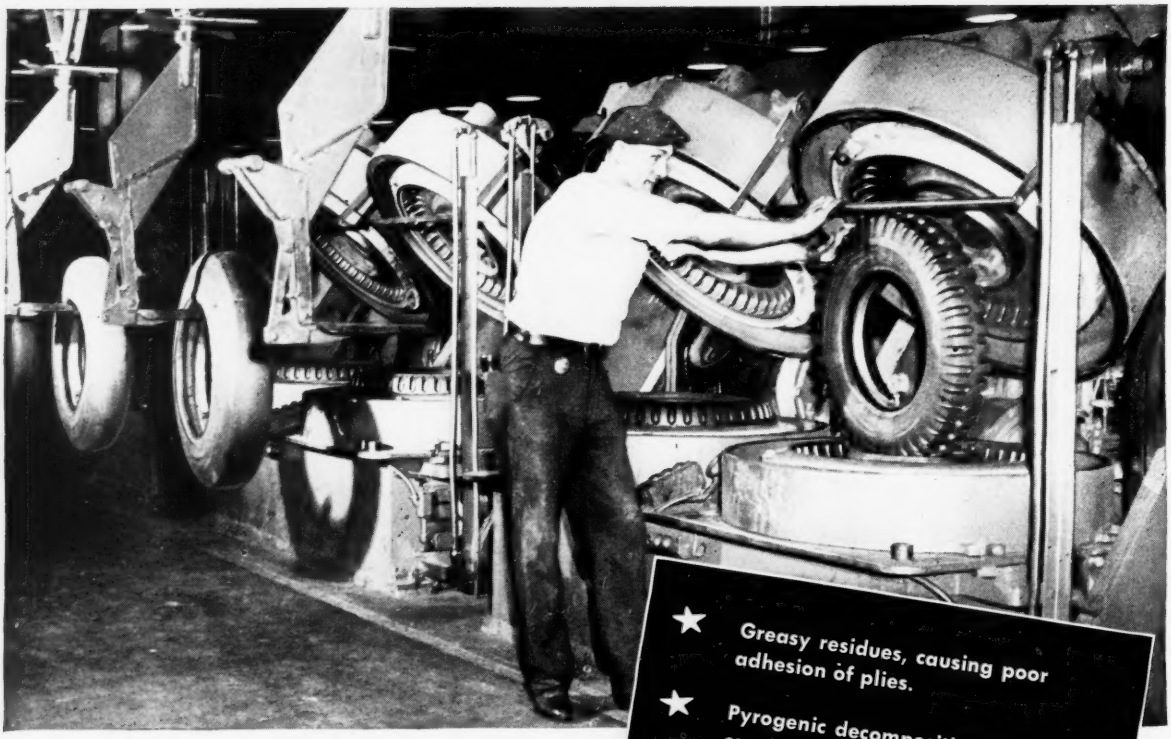
Address_____

City_____ State_____

DOW

CHEMICALS

INDISPENSABLE TO INDUSTRY AND AGRICULTURE



- Greasy residues, causing poor adhesion of plies.
- Pyrogenic decomposition products, causing bad odors.
- Fractional distillation, causing changes in drying time.
- Excessive volatiles, causing moisture condensation.
- Blistering, resulting from high boiling fractions.
- Health hazards, resulting from aromatic and chlorinated compounds.

Skellysolve helps reduce these Solvent Risks in Tire Production Operations!

"DOC" MacGEE SAYS:

Why run undue solvent risks in your tire production lines? With Skellysolve, you have a solvent that helps you make a *superior* product at *less* cost.

Check these outstanding Skellysolve qualities. It is composed essentially of saturated hydrocarbons. It has close boiling ranges and low end points. It is famous for its minimum of greasy residues. It is virtually free of unsaturates and sulphur compounds. It is sweet-smelling, pleasant to work with.

Too, Skellysolve is widely known for its prompt shipment and uniformity of quality. Skelly practically assures you an uninterrupted supply of Skellysolve!

If you have a solvent problem relating to rubber cements or rubber fabricating operations, Skellysolve may be your answer. Skelly's research laboratories and Skellysolve Technical Fieldmen may be able to help you. Get full particulars *now!*

Skellysolve

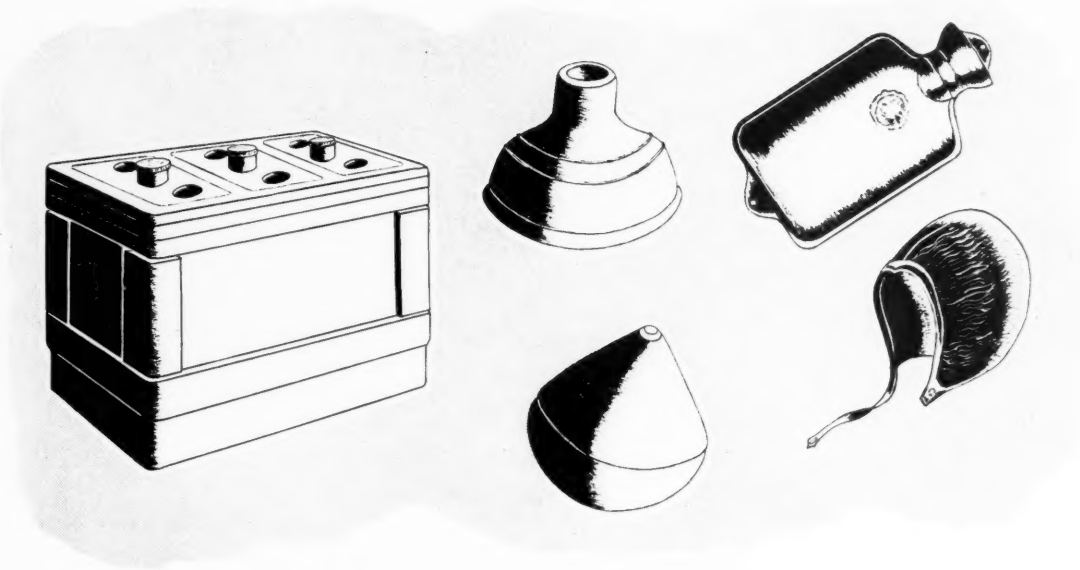
SKELLY

SOLVENTS DIVISION, SKELLY OIL COMPANY, KANSAS CITY, MO.

Coming Next Month...

The Most Modern Mechanical Mold Plant

Will be equipped with the very latest type of machinery for manufacturing mechanical molds.



The machinery for this new plant is being installed rapidly and will be ready to start production within a few weeks to serve the manufacturers of miscellaneous molded products.

WATCH THIS PAGE FOR FULL DETAILS NEXT MONTH

Important Announcement To

ALL EASTERN RUBBER MANUFACTURERS

NEW C. P. HALL PLANT

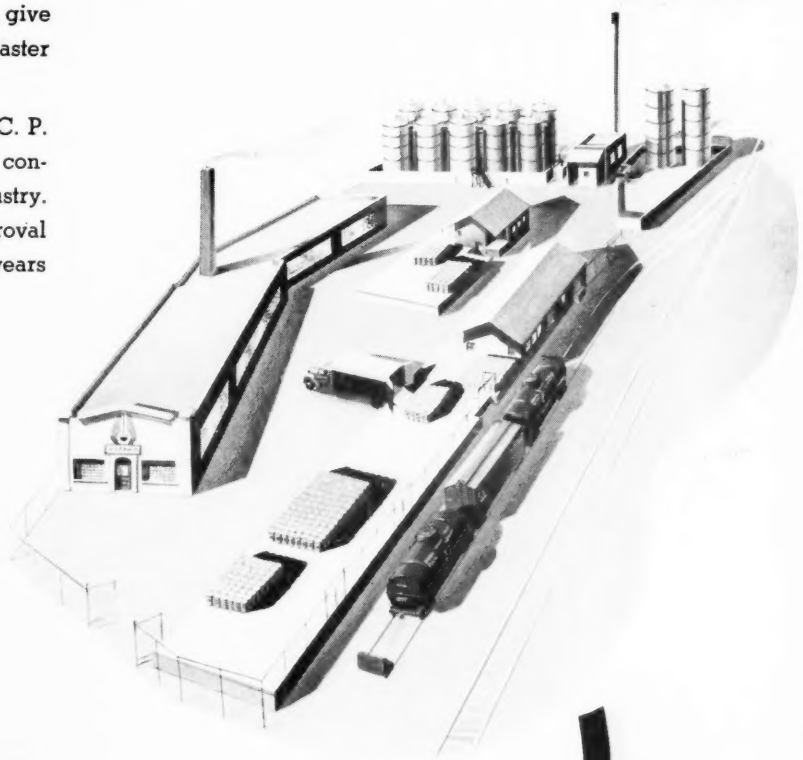
at Bay Ave. and Wheeler Point Rd., Newark, N. J.

OPENS AUGUST 1ST

This new operation enables us to give eastern manufacturers better and faster service than ever.

The Newark expansion marks The C. P. Hall Company's thirty-first year of continuous service to the rubber industry. Your confidence in us and the approval given our products throughout the years justifies these added facilities.

In the Newark plant, as in all other C. P. Hall Company plants, we will stock our complete line of quality chemicals and compounding materials.



The C. P. Hall Co.
CHEMICAL MANUFACTURERS

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NEW!

MAT TRIMMING PRESS

PROVIDES AUTOMATIC CYCLE OF OPERATION

This Farrel-Birmingham, 125-ton capacity, 84″ x 96″ hydraulic press is designed for increased efficiency in trimming automobile mats of the currently used larger sizes.

The automatic, cyclical motion of the press platen and the two tables provides time for removal and placement of stock on one table while stock on the other table enters the press, is trimmed, and withdrawn. Press and tables are hydraulically operated by separate, electrically driven pumping units. Inching motion of any one unit is obtained by selector switch.

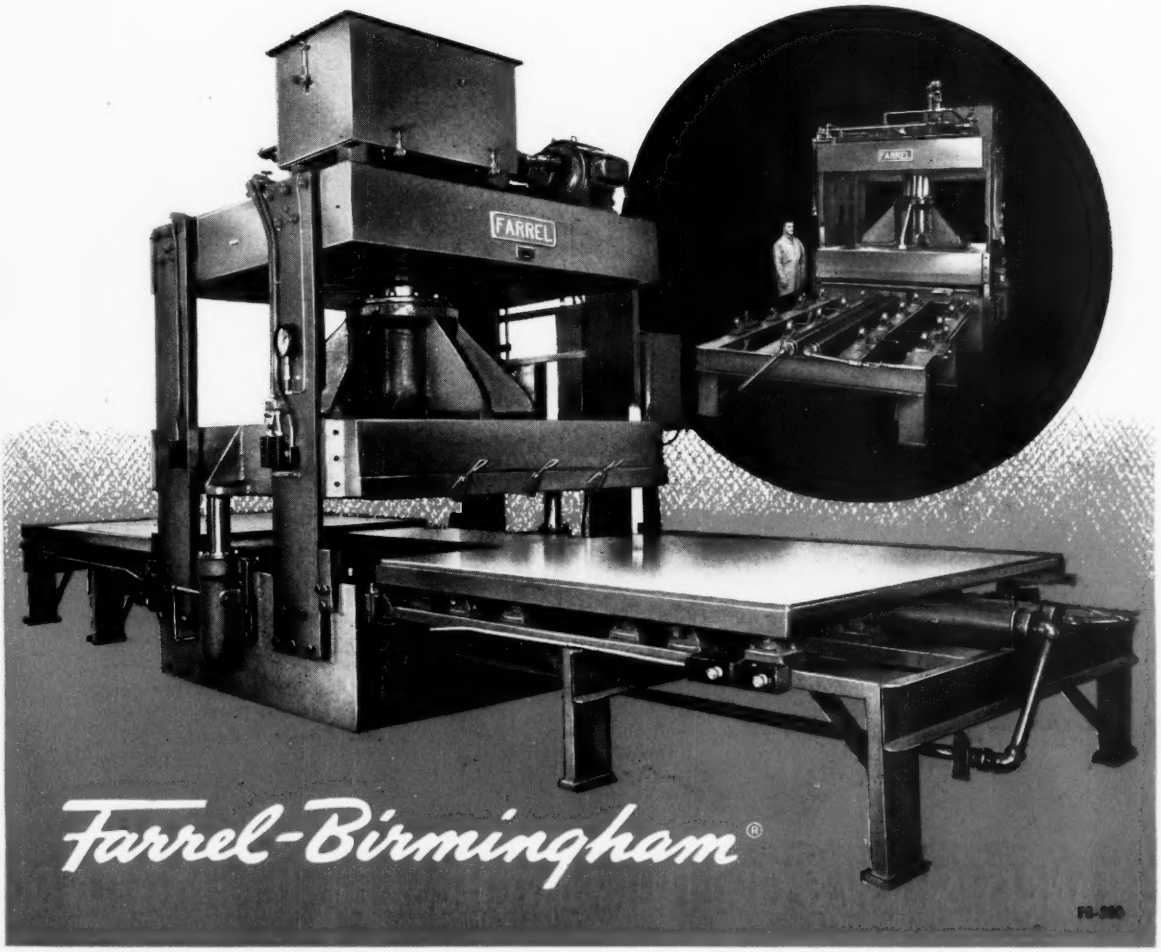
The tables, which operate on antifriction-bearing rollers, are surfaced with ground, hardened steel plates. Adjustable deceleration of table movement assures smooth, controlled action.

The reciprocating cylinder has radial ribs extending over the platen area to provide reinforcement against deflection. Other design advantages include an arrangement for quickly changing the knife setup, outside packing of all rams, adjustable guides on the moving platen, and safety controls to stop all motion.

Write, wire or telephone for further details of this new, efficient press.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

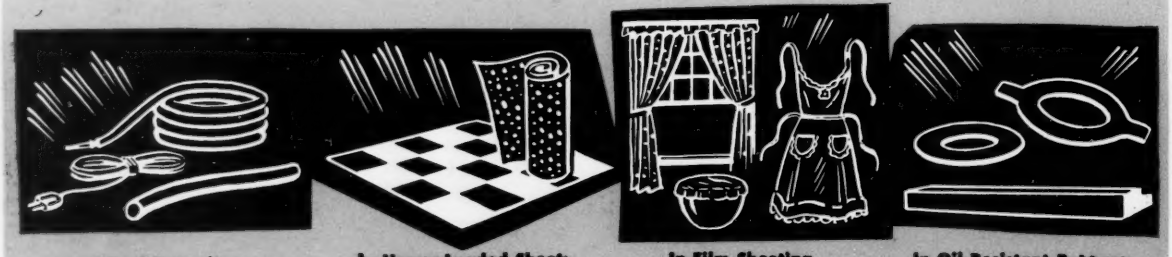
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston.



meet the "POLLY" TWINS

Polycizer 332 AND 162

Two new plasticizers make their debut . . . POLYCIZER 332 and POLYCIZER 162 — a pair that can contribute vital improvements to your vinyl and other synthetic resin and rubber products — and reduce production costs, too —



In Vinyl Extrusions:
For improved heat resistance, higher loading without exceeding hardness requirements, better low-temperature properties, good light stability . . . it's POLYCIZER 332, or for better general plasticizing . . . it's POLYCIZER 162.

In Heavy-Loaded Sheet:
For good heat and light stability . . . it's POLYCIZER 162. For lower plasticizer content or higher filler load without impairment of quality . . . it's POLYCIZER 332.

In Film Sheeting, Plastisols, Organosols:
For low volatility, better heat and light stability, less odor . . . it's POLYCIZER 162. For better low temperature properties, better hand and drape . . . it's POLYCIZER 332.

In Oil-Resistant Rubbers:
For better plasticizing, softer stocks, extreme low-temperature flexibility and low volatility . . . it's POLYCIZER 332. For better plasticizing with low volatility . . . it's POLYCIZER 162.

POLYCIZER 332 (Dioctyl Adipate) is free from odor, is low in acidity and practically colorless. It is recommended for use either as an entire or partial plasticizer in calendering, molding, extruding, organosol and plastisol processes . . . POLYCIZER 162 (Dioctyl Phthalate) is also odorless, low in acid and practically colorless. It is recommended as an all-purpose plasticizer for use with all types of resins.

Write for complete data.

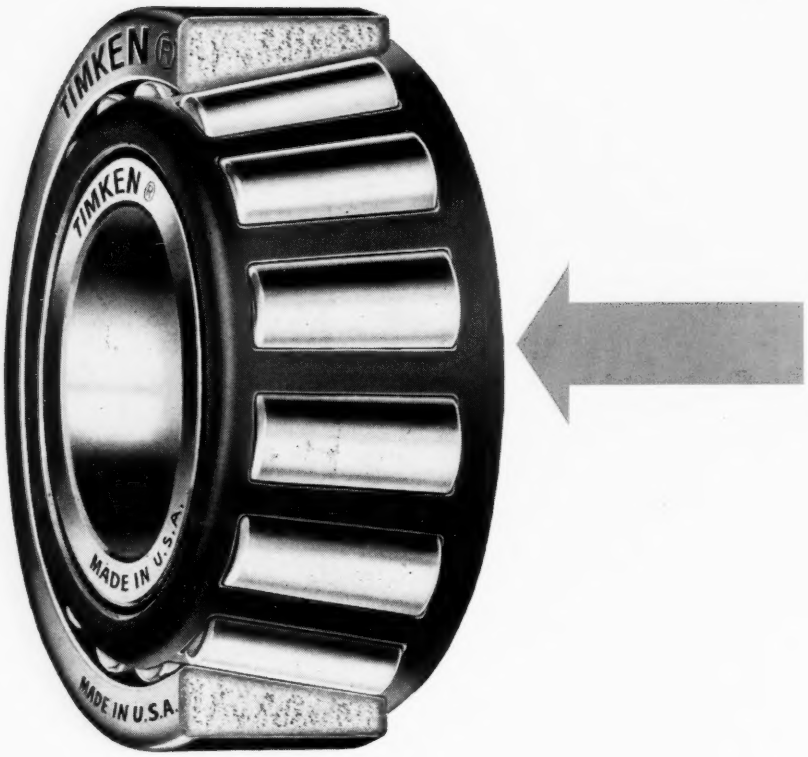
*POLYCIZER is a name registered as a Trade Mark by the Harwick Standard Chemical Co.

HARWICK STANDARD CHEMICAL CO.

AKRON, OHIO

BRANCHES: BOSTON, TRENTON, CHICAGO, LOS ANGELES

ORLD



How TIMKEN® bearings take an extra load off your mind

MOST bearings carry radial loads *only* with extra bearings or washers needed to handle thrust loads. But not with Timken® bearings! Due to their tapered construction, Timken bearings take *both* radial and thrust loads in any combination. Your designs can be simplified, space saved.

Friction is all but eliminated with Timken bearings due to their true rolling motion and incredibly smooth surfaces. Line contact between rolls and races provides greater load-carrying capacity, extra precision. Shafts are held rigid, preventing wobble, deflection or end-movement.

Timken bearings are made from the finest steel ever developed for tapered roller bearings . . . Timken fine alloy steel. They normally last the life of the machine in which they are used.

Remember that Timken bearings in your product add a valuable sales feature. They build greater acceptance for your product among customers. So always look for the trade-mark "Timken" on the bearings you buy. And when buying new machinery, be sure it's Timken bearing equipped. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK REG. U.S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL ◯ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION →✳←

What customers say about

GENERAL ELECTRIC'S NEW SILICONE RELEASE AGENT

"Cuts my rejects from 25% to 10%."
"Most stable emulsion I've seen."
"Leaves no drag marks...gives better release."
"Doesn't discolor white sidewalls."
"Wets the mold better...more stable."
"More even release...prevents pocketing."
"No creaming after 20 days at 70 C... best emulsion we've seen."

G-E 81161

These are typical comments from G-E customers in the rubber industry who have tried the remarkable new G-E silicone mold release emulsion, G-E 81161

HERE ARE THE FIVE BIG ADVANTAGES OFFERED BY THE NEW G-E 81161:

1. Superior mold coverage—better performance on intricate molds.
2. Exceptional stability at room temperatures and above —it remains stable up to 150 F.
3. Hard water stability; it remains stable 24 hours at ½% dilution in water of 750 PPM hardness.
4. Stability under mechanical working; won't break or cream under *repeated* recycling in centrifugal pumping systems.
5. Will not stain light-colored stocks.

If you haven't yet tried G-E 81161, test it in your own plant and see how it helps you mold better products, cuts reject losses and avoids mold down time. For details, write to Section J2, Chemical Department, General Electric Company, Pittsfield, Mass. (Canada: Canadian General Electric, Toronto)

GENERAL ELECTRIC

SILICONES for Industry

Do your rubber products have the sniff that **sells?**

Use Du Pont **"Alamask"** odorants
TRADE MARK

Give your rubber products more customer appeal with "Alamask" odorants! Often times, it's the sniff that *sells*

Here are some specific—and successful—end uses for new "Alamask" odorants: For rug underlays (natural and synthetic, open or closed cell structure): "Alamask" LD, "Alamask" 6390, "Alamask" O. For blown natural-sponge pillow and mattress stock: "Alamask" O. For shoe adhesives, from natural latex: "Alamask" ND, from synthetic latex: "Alamask" 6337, "Alamask" 175. For rug backings: "Alamask" LD, "Alamask" ND. For natural smoke sheets: "Alamask" O.

Du Pont **"Alamask"** odorants
TRADE MARK

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Find out more! Send for the booklet "Odorants for the Rubber Industry"—or ask us for specific recommendations for your individual problems. Write—E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Department, Aromatics Section, Wilmington 98, Delaware. Branch Offices: Atlanta, Boston, Charlotte, Chicago, New York, Philadelphia, Providence, San Francisco.

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Available as Prevulcanized, Vulcanizable, or Unvulcanized

We supply natural and synthetic rubber latex and latex compounds for hundreds of products in over twenty industries. If you are bonding, coating, impregnating, saturating, extruding, flocking, molding, casting, or dipping, we can offer you industrially proven compounds. For new and special purposes we are prepared to develop new compounds.

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Napped Fabrics
Paper
Rug Sizing
Rug Underlays
Thread
Tire Cord

COATINGS
Bath Mats
Canvas Gloves
Felt
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Sheeting
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Wire Goods

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Casting and Molding
Chewing Gum
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Rubber Dolls
Advertising Novelties

July, 1950

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A Bill Brothers Publication

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A BILL BROTHERS PUBLICATION

INDIA
RUBBER WORLD

Volume 122 New York, July, 1950 Number 4

Developments in the Tire Industry in 1949

William F. Perkins[1] and Harold Gray[2]

THE tire industry had no major design changes of industry-wide significance in 1949, but owing to market shortages and relative costs several material changes of general application were necessary.

In the compounding field, the use of low-temperature GR-S, or "cold rubber," continued in volumes limited only by the extent of the manufacturing facilities for this rubber, and owing to the increased tread wear possible with this type of polymer, its future seems assured, as processing problems (at first a major consideration) have largely been solved.

The relative use of natural and GR-S types of rubber fluctuated throughout the year, following market changes closely. Prospective decreases in natural rubber supply seem to assure that present quantities of GR-S, or greater, will continue to be used. Figure 1 shows the relative total natural and GR-S type of rubber use in comparison with tire production for the years 1942 through 1949.

For inner tube manufacture there was a partial change to natural rubber resulting from the cold buckling of Butyl rubber tubes in certain cold areas of the country, but this trend has been largely reversed, or at least retarded, by the use of improved compounding techniques and the availability of a tougher Butyl rubber. Butyl rubber tubes are now giving a good account of themselves in the colder regions. The excellent air retaining properties of the tubes made from the newer Butyl rubber is, of course, maintained.

Compounding and Fabricating Materials

No new general-use, large-volume pigments for tire compounding were introduced in 1949, but the trend toward the greater use of furnace-type carbon blacks in place of channel-type blacks continued.

The use of rayon in tires during 1949 was limited somewhat by the supply, but its use was nevertheless extended as far as size and type of tire were concerned. Tires made with nylon reached production quantities during the year, and in spite of certain growth and cost problems nylon is apparently slated to become a major tire fabric material.

Wire cord for tires continued under development by various major companies, but owing to cost and service limitations has not yet proved to be a serious competitor

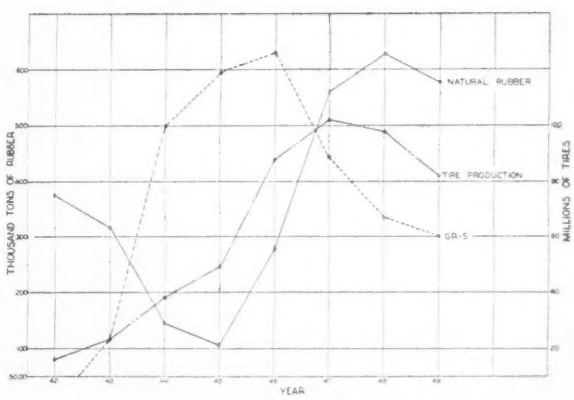

Fig. 1. Relative Total Use of Natural and GR-S Type of Rubbers Compared with Tire Production for the Years 1942-1949

of other cord materials although any new developments should be watched closely, in particular those which would result in lower raw material costs.

New Tire Types and Treads

The type of tire for new passenger cars was changed almost completely from the conventional to the extra-large carcass, lower operating air-pressure type despite certain problems concerning the service life, which caused some consumer complaints. The increase in riding comfort of the low-pressure tires was the major reason for the change in addition to the advantage of the larger appearance of the tires. The increased use of "cold rubber" improved the ultimate tread life of the tire at the same time.

One manufacturer introduced a white sidewall tire featuring a narrow white sidewall strip and a heavy rib at the top of the white sidewall to protect the tire from curb scuffing. Figure 2 compares the white sidewall sections of the conventional, extra-low pressure, and the narrow white sidewall tire with the scuff rib. The area between the scuff rib and the rim is the white sidewall portion on all three types.

Puncture-sealing tubeless tires, which were introduced

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in 1948, gained in sales volume and, while offered only by one manufacturer, have made a definite place in the field.

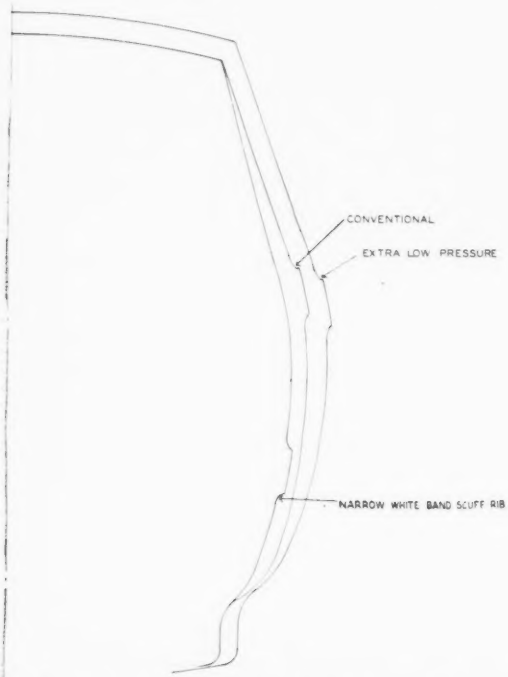

Fig. 2 Comparison of White Sidewall Sections of Conventional, Extra-Low Pressure, and Narrow White Sidewall with Scuff Rib Types of Tires

Owing to recent changes in body and fender designs, the application of tire chains has become an extremely difficult operation. In addition, tire tread patterns have become more and more of the circumferential bar type in order to minimize road noise, and as a consequence of these two actions, the public has been demanding a tire more suitable for driving on icy streets and in snow and mud. All manufacturers have offered special tires of this mud and snow type, and many recapping materials and tread treatments have also been developed, such as special compounds containing salt, sawdust, etc., special groovings and sipings, wire spring inserts, etc. Some of these have been quite successful. Figure 3 shows typical mud and snow tread patterns in use at the present time.

Truck tires were not changed in design to any extent during the year, but the premium type, extra-service tire increased in sales acceptance. Also, as noted above, the nylon truck tire assumed new importance, and indications are that this-type tire will be a permanent addition to heavy-duty tire lines.

Several new tread patterns in farm service-type tires were introduced during the year, all designed to give longer wear, better pulling power, and greater riding comfort for the tractor operator. This field has become an important phase of the tire business, and tread patterns are of extreme importance to the tire's operation. Changes introduced and illustrated in Figure 4 were all of the herringbone cleat type; the closed center-type tire which was once very popular is being supplanted for the most part by the open center design.

New Processing Equipment

New processing equipment of industry importance

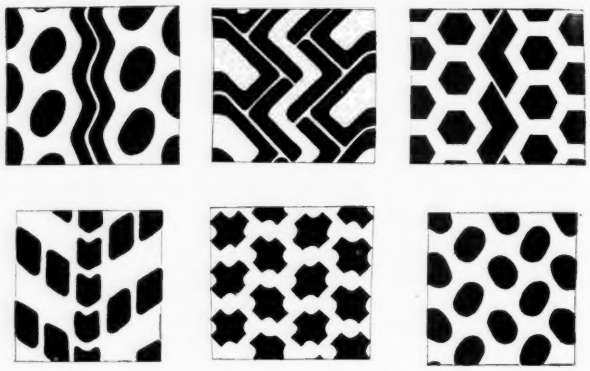

Fig. 3. Typical 1949 Mud and Snow Tire Tread Patterns

was limited to the general experimental introduction of the Bag-O-Matic type of individual vulcanizers, which eliminate the use of the conventional air or steam bag. This new-type vulcanizer, because of the elimination of bag manufacture, bag maintenance, the forming operation, bag insertion and bag withdrawal steps in the curing cycle, has met with considerable acceptance, and increased development is anticipated on this-type curing.

General Summary and Conclusions

The competitive sales conditions under which tires are distributed, the increased efficiency in processing and manufacturing techniques, which have tended to offset increased labor costs, and the stabilizing effect of GR-S production were combined to allow the tire industry in 1949 to offer the public a bargain in consumer goods as compared to many other general industry items. Selling prices of tires were not increased in proportion to the general price levels, and quality, as measured by ultimate consumer service, was not allowed to drop, but was increased on many fronts.

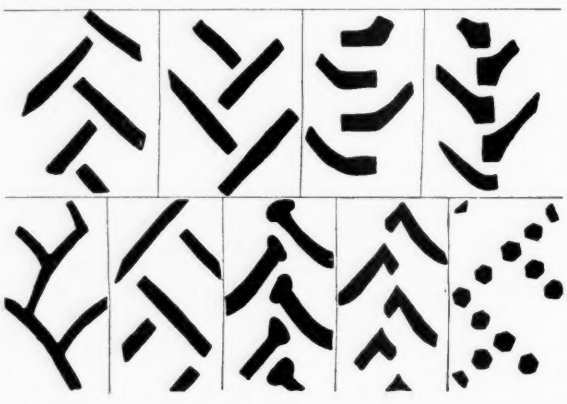

Fig. 4. Typical 1949 Farm Service Tire Tread Patterns

"Isocyanate-Based Adhesives." Technical Bulletin No. P-145. Monsanto Chemical Co., St. Louis 4, Mo. 14 pages. A comprehensive review of the development and present practice, both German and American, of isocyanate-based adhesives is offered in this bulletin. Examples of German and American formulations for bonding various combinations of materials are included and discussed. An explanation of the adhesion mechanism appears, together with the properties of two diisocyanates available from Monsanto.

Test Methods for Elastomers at Extreme Low Temperatures[1]

Robert F. Shaw[2]

THE increased demand for chemical rubber components of military equipment to function at extreme low temperatures down to —70° F. has shown that the present rubber procurement specifications are inadequate in specifying the proper test method(s) for obtaining articles that will operate satisfactorily for extended periods under Arctic conditions.

A move to remedy this condition is now in progress with the revision of Federal Specification ZZ-R-601a "Rubber Goods: General Specifications (Methods of Physical Tests and Chemical Analyses)" by cooperating federal agencies.

Even though the revised ZZ-R-601a specification contains methods representing each of the types of low-temperature physical tests, difficulty will still be encountered in adopting the proper method for the specific application desired as given in the detail specification. In this event an actual service test is the only alternative.

Numerous physical tests on chemical rubber compounds have indicated that a compound which may pass the bent loop brittleness test at —70° F. may fail to perform satisfactorily in a service test, such as the cycling of brake cups at this temperature. The reverse has also been encountered in another case where an "O" ring packing failed the bent-loop test at —70° F., but performed satisfactorily in an actual service mechanism at that temperature.

TABLE 1. LOW-TEMPERATURE TEST METHODS FOR ELASTOMERS

	Bibliography Reference*
Brittleness Test Methods	
Bend Tests—Loop and rod	1
Mandrel bend	2
Bent loop	3–6
Impact tests—Drop test (ball or weight)	1, 7–8
Hand crank and quadrant	9–12
Motor crank and quadrant	13–15
Pendulum hammer	16
Solenoid hammer	5, 17–19
Piston hammer	20
Charpy pendulum	12
Izod pendulum	21–22
Bullet shatter	23
Hardness Test Methods	
Penetration tests—Shore A durometer	5, 7, 24-25
Shore D durometer	26
Rex gage	12
Hardness decadence—Shore A or ASTM tester	27
Structural Test Methods	
Dimensional—Dilatometer	28–30
Crystallization—X-ray, refractive index	31–33
Elastic Recovery Test Methods (Deformation-time)	
T-50 retraction temperature	7, 34–37
Permanent set	29, 35, 37
Compression set	38–39
Speed of retraction	40
Compression stress decay	12, 41-44
Tension creep constant	45–46
Modulus or Stiffness Test Methods (Stress-Strain)	
Simple beam in flexure	45, 47–50
Cantilever beam in flexure	12, 51–53
Stiffness in torsion	24, 40, 54–57
Shear	—
Extension	4, 46, 58–59
Other Test Methods	
Electrical—resistance	35
Permeability—gaseous	35
Tensile strength	35–36
Resilience	60–64
Diaphragm reversal	7
Service Testing	
Cycling—packings, gaskets, brake cups	
Performance—tires, tubes, shock absorbers, torsion bushings	
Flexing—hose, belts, wire, mechanical goods	

*Bibliography references appear at end of this article.

Another interesting case is that of a butyl inner tube that failed in service at —70° F. and in the bent-loop brittleness test at —64° F., but appeared satisfactory when evaluated by a flexibility method such as torsion stiffness at —70° F.

A variable which has a profound effect on the elastomer is the length of exposure time at the low temperature. Present methods of tests should have a minimum of 24 hours' exposure in order to evaluate properly the physical property being determined.

In order to be able to specify the proper test method(s) for use in obtaining material by procurement specification, many different test methods have been investigated, and a search of the literature has been made for others.

The results of this library survey, the classification of the low-temperature test methods used in the past, and the details of new or revised tests used at Rock Island Arsenal are given in this article.

Low-Temperature Tests for Elastomers

A classification of the various test methods and the bibliography references pertaining to them are shown in Table 1. These methods are classified according to the physical property which they measure. It should be emphasized that comparison between the various methods is difficult because each test usually specifies an exposure time which differs from the others.

Brittleness Test Methods

The loop and rod, bend test (1) consists of a rubber specimen bent 180 degrees into a loop and fastened. After exposure to the test temperature the relative flexibility between samples can be determined by means of a glass rod used to depress the loop. If a rapid push is used, the loop may break.

The mandrel bend test (2) uses a round rod mounted in the cold chamber around which a rubber specimen is rapidly bent. The temperature at break is recorded.

The bent loop test (3-6) commonly referred to as the "Thiokol Test," consists of a fixture comprising two parallel plates supported in guides so that the plates may be rapidly brought from 2½ inches to one inch apart. The rubber specimen used is an ordinary tensile piece clamped to each of the plates. The plates are brought together "as rapidly as possible" to determine if the specimen will break. The main complaint against this device is that the force and the time are not specified. The reported exposure time is usually five hours at the low temperature.

The drop test (1, 7-8) is an impact blow delivered to a rubber specimen by a ball or weight dropped from a known height. The temperature at which the specimen cracks or shatters is recorded.

[1] The opinions or assertions contained herein are not to be construed as official or reflecting the views of the Department of the Army.

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The hand-crank and quadrant apparatus (9-12) determines the temperature at which a material becomes brittle when immersed into liquid coolant. The thickness of material and the rate of bending affect the breaking of the rubber specimen, which is mounted on the quadrant. The hand-crank and quadrant forces the specimen against a rod, causing it to fracture.

The motor crank and quadrant (13-14) is similar to the above except that the force and the speed of the sector are fixed, thereby eliminating these variables. This device is considered the most satisfactory for immersion brittleness tests for short periods of time.

The pendulum hammer (16) consists of a hammer of definite weight(s) positioned to strike an air-cooled rubber specimen at a definite angle and at the same rate of speed to determine brittleness.

The solenoid hammer (5, 17-19) or plunger is a device with an electric solenoid plunger that causes a definite impact blow to be imparted to the cooled rubber specimen so as to cause fracture.

The piston hammer (20) is another device that imparts a definite impact blow to a cooled rubber specimen having one end placed in a clamp.

The Charpy pendulum (12) utilizes a strip specimen which is placed on the anvils of the test fixture, cooled to the desired temperature, placed on the impact tester as rapidly as possible, and allowed to be struck by the pendulum. The residual pendulum energy is not measured, and the brittle point is recorded as the highest temperature at which the specimen breaks.

The Izod pendulum (21-22) test determines the highest brittle temperature for a cooled rubber specimen ½ inch wide by six inches long by 0.080-inch thick. The specimen is clamped in the fixture, cooled in a dry ice chamber for 20 minutes, then quickly removed, and tested. The brittle temperature has been found to be lowered by decreased pendulum energy and raised by increased energy. The brittle temperature of some rubbers has been found to be higher for increased exposure time.

The bullet shatter test (23) was devised to provide a constant, reproducible blow to a cooled rubber sheet. The nature of the hole indicates the brittleness of the sample.

Hardness Test Methods

The Shore A durometer (5, 7, 24) has been used extensively to indicate the increased hardness of elastomers at decreased temperature. At extreme low temperatures all the readings approximate 100 on the scale so that the relative hardness of various stocks cannot be distinguished.

The Shore D durometer (26) has been used to extend the hardness range and usability of a hardness-type instrument. The "D" scale durometer is commonly used on plastics and hard rubber and contains a sharp indentor. Hardness values have shown good correlation with brittleness and elastic recovery methods.

The Rex gage (12) is similar to the Shore A durometer in its reaction, but is inferior because its scale cannot be read to so fine a degree of accuracy as the Shore A or the Shore A2 durometers.

The hardness penetration (25), as measured by a cathetometer has been used to determine the indentation of rubber by a pin pressed into a cooled rubber sample.

The hardness creep or decadence (27) indicates the loss or decay of hardness with time. The Shore A or ASTM tester is used, and readings are taken at five- and 30-second intervals.

Structural Test Methods

Changes in the internal structure of polymers can be determined by dimensional changes (28-30), as measured by a dilatometer or by a linear contraction test. The change in slope of a plot of volume *versus* temperature at the second-order transition temperature of the material indicates this change.

Further evidence of internal structural change is given by X-ray, (15, 31-32) studies of polymers at low temperatures. Definite halo spot patterns obtained at low temperatures indicate crystallinity.

Measurement of the refractive index (33) of raw polymers in thin films at low temperatures has shown good correlation with brittle point values determined at low temperatures.

Elastic Recovery Test Methods

The T-50 test (7, 34-37) for state of vulcanization is probably the earliest low temperature test. In this method a stretched rubber sample is cooled to a temperature sufficiently low so that there is little or no retraction when the tension is released. The cooling bath is allowed to warm up slowly, and the specimen begins to retract. The temperature at which the specimen recovers 50% of the original stretched elongation is known as the T-50 point. Although designed for natural rubber the test has value for other elastomers provided the immersion fluid does not affect the sample. A graph of the retraction in percentage *versus* temperature is also used (T-R).

Permanent set (29, 35, 37), as determined on a tensile specimen at low temperatures, has been used as a measure of a material's suitability for low temperature service. The plot of permanent set *versus* elongation at varied temperatures shows the elastic recovery of the elastomer.

The cold compression set (38-39) of vulcanized rubbers evaluates the suitability of a material for gaskets and packings since the sealing efficiency is dependent on the elastic recovery or kickback of the rubber between the confining surfaces. Compression set at various time intervals of recovery is an indication of compression recovery.

The speed of retraction (40) of a cooled rubber specimen has been used to show differences in the relative elastic recovery of elastomers which cannot be distinguished by brittleness or flexibility measurements at low temperatures.

The compression stress decay apparatus (41-42, 44) is a deformation-time device whereby a rubber plug specimen can be compressed to a definite load or deflection, and the change in deflection or force required to produce this deflection can be measured without releasing the specimen. The apparatus is maintained at the low temperature while the readings are taken.

The tension creep constant (45-46) is determined by the application of a constant load, usually to a specimen in tension. The rate of creep at various temperatures is measured. A constant strain (stress relaxation) is theoretically best for a mathematical analysis, but measurements at constant load are easier to obtain.

Modulus or Stiffness Test Methods

The discontinuity of a physical property, as determined by modulus or stiffness, deformation in extension, compression, flexure, torsion or shear, is used as a measurement of the suitability of a material for low temperature usage. It should be emphasized that the property being measured should be the one which is critical in the application of the rubber.

The stiffness of a simple beam in flexure (45, 47-50) has been used to a great extent in determining Young's modulus of elastomers exposed to low temperatures. The test consists of a cold chamber, a rubber specimen sup-

Fig. 1. Shore D Durometer Hardness Tester, as Used by Rock Island Arsenal Laboratory

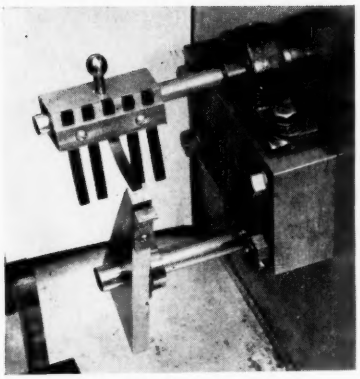

Fig. 3. Revised Low-Temperature Impact Brittleness Apparatus, as Used by Rock Island Arsenal Laboratory

ported on anvils, and an indicator rod in the center of the specimen that produces the measured deflection. Young's modulus is calculated, and a plot is made of modulus *versus* temperature. A limiting modulus value of stiffness at predetermined temperature for a particular application is considered satisfactory for a procurement specification.

The stiffness of a cantilever beam in flexure (12, 51-53) is the basis of measurement by several different types of apparatus. All are essentially alike in that a rubber specimen is held firmly by a clamp at one end, and a string or roller at the other deflects the specimen. The force required to produce a definite deflection or the deflection produced by a given force is a measure of the stiffness at low temperature.

The stiffness of a rubber specimen in torsion (24, 40, 54-57) is a popular type of measurement that gives fast, accurate results. The twist in degrees plotted *versus* temperature gives an "S" shaped curve. The rapid change of slope provides an indication of the limiting temperature at which the material becomes unserviceable.

The stiffness in flexure of a loop (65) specimen is determined by measuring the vertical displacement of a rod by means of a cathetometer pushing against a rubber loop supported on a balance platform to provide a constant force, as indicated when the balance pointer reaches zero.

Stiffness in shear has been investigated in several laboratories. The test setup is similar to the Young's modulus apparatus since it measures the vertical deflection produced by a known load. A disadvantage is that the deflections are slight, and a good rubber-to-metal bond is required.

Stiffness in extension (4, 46, 58-59) has been measured by determining the modulus-temperature relation or the stress required for a given per cent. elongation, using either a tensile or a T-50 specimen.

Other Test Methods

The change in electrical resistance (35) and the gaseous permeability (35) has been used to determine the effect of low temperatures on rubber.

The measurement of low-temperature tensile strength (35-36) has been used as an index of the suitability of rubber.

Resilience measurements (60-64) at low temperatures have been used to determine serviceability. The measure of damping as a criterion of the elastic behavior of soft rubber subjected to dynamic stresses is applicable to such applications as motor mounts. Conventional pendulum rebound, or Yerzley methods do not work well at temperatures below —20° F. because of the inelasticity of the rubber. Dynamic methods, such as the forced resonance vibrator, appear to be more practical.

The diaphragm reversal method (7) is based on an actual service usage. The stiffness of a diaphragm is measured by the air pressure or vacuum required to reverse its position.

Service tests are as many and as varied as there are applications for rubber parts.

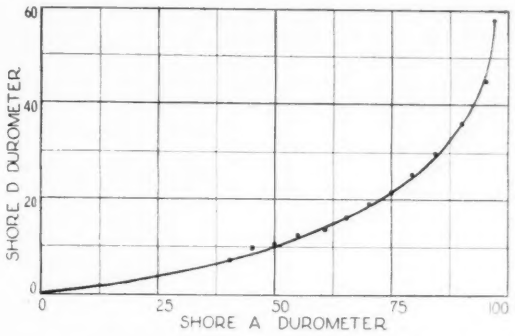

Fig. 2. Conversion Chart for Shore D to Shore A Hardness Values

Modernized Low-Temperature Methods

Test methods representing the hardness, brittleness, stiffness, and elastic recovery classifications have been revised and extended over the limitations of currently accepted standard test methods at this Arsenal for rubber products.

Hardness

The standard method for the determination of hardness at low temperatures differs little from the method used at room temperatures. The use of the Shore A durometer or the Rex gage, however, leaves much to be desired since in the range 90-100 a leveling off tendency is noted which is incapable of distinguishing between stocks having vastly different properties as determined by some other test method.

Since rubbers, when subjected to low temperatures, become hard and inelastic as ebonite or semi-rigid plastics, the instrument used for determining hardness for these type materials; namely, the Shore D durometer, was used to determine hardness at low temperatures. This device is shown in Figure 1.

A conversion chart for readings made at room temperature giving the relation of the Shore A and the Shore D durometers is shown in Figure 2.

The test procedure used includes conditioning of both the half-inch thick rubber pellets and the instrument in a dry ice-cooled air chamber for 24 hours before readings are taken. The highest reading indicated on the dial is recorded as the hardness at the best temperature.

Brittleness

Brittleness at low temperatures is determined using the principles of the apparatus developed by the Bell Laboratories and standardized by the American Society for Testing Materials and designated as method D746-44T. The apparatus, however, has been revised so that longer exposure conditioning times can be obtained as well as modified so that five specimens can be tested consecutively. The effect of fluids on the sample has been eliminated.

The apparatus is mounted in a cold box cooled by dry ice gas circulated by a fan controlled by a thermo-

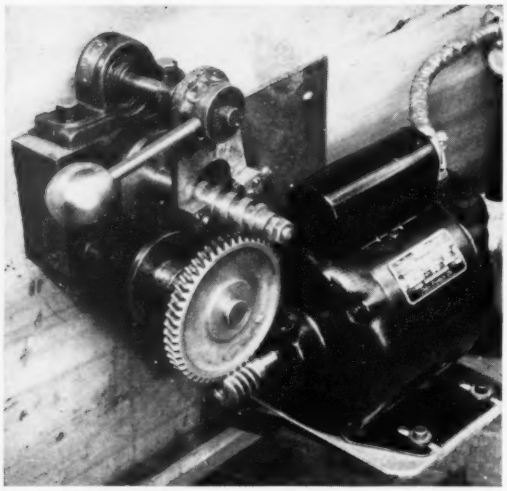

Fig. 4. Details of Drive Mechanism for Revised Low-Temperature Impact Brittleness Apparatus

stat. An additional fan maintains circulation within the box to prevent any stratification. The temperature of test is determined using a copper-constantan thermocouple connected to a potentiometer.

The specimen holder has been modified so that five specimens can be inserted at one time and struck consecutively by the motor-driven impact hammer. The specimen holder is shown in Figure 3. It consists of a grooved brass block secured to a rod by a metal pin. This pin provides proper alinement so that the striker arm hits the rubber specimen in the exact position. The rod travels through the sidewall of the cold box and is connected to a dog-clutch which can be engaged in a spiral cut groove drive mechanism, powered by the same drive that actuates the striker arm. Details of the apparatus are shown in Figure 4.

The procedure of operation follows. The motor is turned on and allowed to turn the striker for one-half minute in order to come up to speed. The clutch is then engaged bringing the specimen holder rod over so that the striker arm hits the first rubber specimen. Successive rotations of the striker are synchronized so as to hit the other specimens squarely as the rod is moved normal to the path of the striker arm.

The specimens are conditioned one hour at the test temperature, and the brittle point is recorded as the lowest temperature at which non-failure occurs. The apparatus is suitable for making tests over long periods of time.

Stiffness

The low-temperature torsional stiffness apparatus is patterned after that of Clash and Berg. It consists of a rectangular rubber specimen clamped between a stationary and a movable clamp which is affixed to a shaft having a circular plate graduated in circular degrees at its top. This plate serves as a torsion head when twisted by two 50-gram weights suspended by pulleys.

The liquid cooling medium (a low viscosity silicone oil) can be maintained at a definite temperature (± 1° F.) for extended periods of time. The cooling system consists of a Dewar flask, an immersion bath, a circulating pump, a thermoregulator, a stirrer, and a copper cooling coil in both the flask and the bath. Acetone is circulated by means of the pump, which is controlled by the thermoregulator in the immersion bath, through the copper coil in the immersion bath. Both the Dewar flask and the bath are in insulated boxes. The apparatus is shown in Figure 5.

The procedure of operation is as follows. Torsion readings are taken as the bath is cooling in order to determine the approximate temperature at which the 50-gram weights produce a 200-degree twist in five seconds. The bath is then warmed up in two-degree intervals from a colder temperature and held at each temperature for five minutes before the reading is taken. The reading which is recorded is the T_{200}, or the temperature at which a deflection of 200 degrees is produced in five seconds.

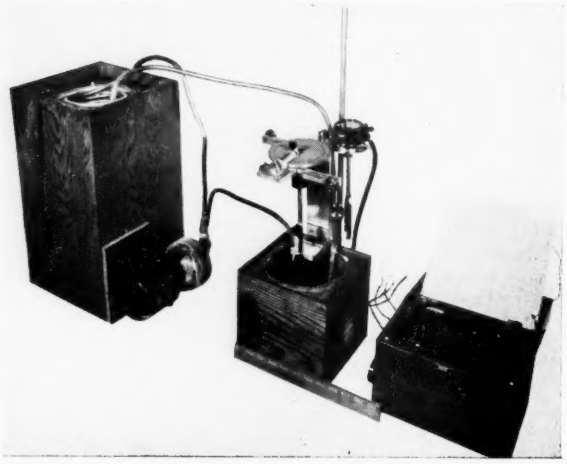

Fig. 5. Low-Temperature Torsional Stiffness Apparatus Used by Rock Island Arsenal Laboratory

A plot of stiffness, as indicated by the degrees of torsional twist *versus* the temperature, produces a hyperbolic curve such as is shown in Figure 6.

Some values for torsional stiffness, T_{200}, on Butyl and natural rubber inner-tube stocks in comparison with hardness, and brittleness according to ASTM D736 and D746 are given in Table 2.

TABLE 2. STIFFNESS-BRITTLENESS AT VARYING EXPOSURE TIMES OF INNER TUBE STOCKS

Material	Hardness −70° F. (48 Hrs.) Shore D	Clash & Berg Torsion T_{200}	Brittleness ASTM D736	ASTM D746 Min.		ASTM D746 Hrs.	
Exposure Time	48 Hrs.	5 Min.	5 Hrs.	5	20	5	24
Butyl inner tube	65	−56	Broke @−64	−49	−46	−40	−40
RIA-14 (Butyl)	68	−62	OK @−70 Broke @−50 (48 hrs.)	−69	−57	−50	−50
Natural rubber inner tube	48	−72	OK @−70 Broke @−74	−74	−74	−66	−65
RIA-A6 Natural	55	−80	OK @−70 Broke @−74	OK-90	−83	−81	−81

Elastic Recovery

The recovery of rubber from a compression deformation is measured using in general the ASTM method D395-40T method B compression set under constant deflection. However the task of removing the nuts from the bolts of the apparatus at low temperatures is not conducive to rapid measurement of the specimen thickness after the pressure is released. It is important to know the thickness after ten seconds have elapsed so that the compression recovery may be calculated.

In order to facilitate such rapid measurements, a quick release apparatus has been devised. This consists of a 10-inch vise-grip wrench with the jaw length extended ½-inch by removal of metal in the neck of the wrench.

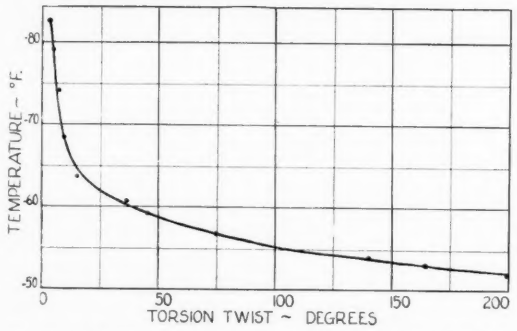

Fig. 6. A Plot of Stiffness as Indicated by Torsional Twist *versus* Temperature

The wrench is used to clamp the assembly of two metal plates and a spacer ring around the rubber specimen. The plates are two- by three- by 0.125-inch chrome-plated steel panels. In lieu of spacer bars, a 1⅜6-inch inside-diameter plated steel ring is used to distribute the clamping pressure uniformly without distorting the plates. The ring is sufficiently large to allow for the deformation of the compressed rubber specimen. The rings have the same thickness as the bar spacers and are used for the same hardness ranges as is given in the ASTM specification.

The apparatus is easily assembled and released so that rapid measurement of the rubber specimen can be made. The assembled and released apparatus is shown in Figure 7.

The procedure used in testing follows. The thickness of the specimen is determined; the hardness determined, and a spacer ring chosen so as to conform to this hardness, and the apparatus is assembled. The test conditions are usually exposure for 22 or 94 hours at temperatures of —40, —60, and —70° F. A chrome-plated micrometer is used for measurements and is conditioned at the test temperature also. Readings are taken 10 seconds and 30 minutes after the device has been disassembled. The compression set is calculated in the same manner as in the ASTM method. In addition, for determining the elastic recovery, an additional calculation is made as follows: the 30-minute reading minus the 10-second reading is divided by the 30-minute reading and then multiplied by 100 to get per cent. recovery for a definite time interval.

Summary

A study was made of the methods and apparatus used in measuring low temperature properties of elastomers. A classification of these methods based on the physical property they measure follows: brittleness, hardness, structural, elastic recovery, stiffness or modulus, service tests and all others.

Factors affecting low temperature measurements are those of composition: namely, type of polymer and polymerization temperature, type and amount of plasticizer, type and amount of filler, state of cure and sample size; those of type of test: namely, duration of exposure, stress or load, rate of application, and method of applying stress or load, type of cooling medium and its effect on the sample, rate of cooling, and the precision and reproducibility of the test method.

A bibliography of 65 literature references is given pertaining to the various methods of low temperature measurement, and a brief résumé of these methods is also given.

A description and photographs of new or modified methods of low temperature measurement representing the hardness, brittleness, stiffness, and elastic recovery classifications used at Rock Island Arsenal are presented.

The author wishes to express his appreciation to the Ordnance Department, Research and Development Division of the Department of the Army, and to the supervisory staff of the Rock Island Arsenal Laboratory for permission to publish the information given in this paper.

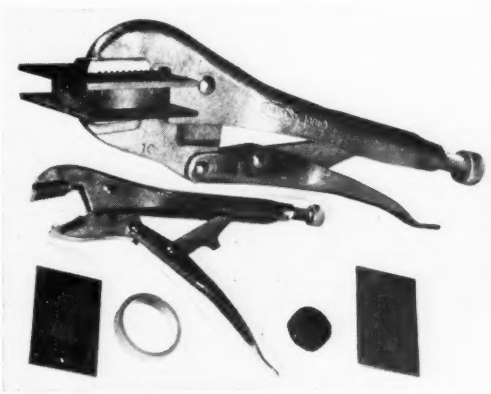

Fig. 7. Rock Island Low-Temperature Compression Set Quick-Release Apparatus

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(Continued on page 427)

Small-Farm Rubber Production in Latin America

R. D. RANDS[1] and William Mackinnon[2] in an article in the U. S. Department of Agriculture's publication, *"Foreign Agriculture"*, for March, 1950, report further on the cooperative efforts between neighboring nations which they say "has strengthened the footings of the Western Hemisphere's natural rubber industry." This cooperative program was reported in India RUBBER WORLD in 1942 and 1947.[3]

"Successful methods have been found for growing rubber trees that are both high in yield and resistant to such enemies as South American leaf blight. As the cooperative work progressed, it became apparent early that natural rubber production offers excellent possibilities as a new cash crop for many small farmers of Latin American countries," the article states and continues in part as follows:

"Today there are some 30,000 acres of demonstration rubber plantings, including many family-type farms, in 12 Latin American countries. Most of the larger countries, determined to be self-sufficient in rubber, either have begun or are considering programs to encourage small-farm plantings. Because of the unpredictability of rubber economics of the future, a go-slow policy appears advisable in expanding the acreage of natural rubber in the smaller countries that use little rubber and that are dependent on exporting at world rubber prices. Nevertheless, the advantage to small farmers of having an additional cash crop, where markets warrant, is obvious.

"The small-farm plantings now existing were made possible by the cooperative program that has been going on since 1941 between the United States Department of Agriculture and the Governments of Brazil, Colombia, Costa Rica, the Dominican Republic, Ecuador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, and Peru. The scene of most field experiments with rubber, these plantings have become indispensable centers for the research phases of the program.

"According to experience in the Far East, the small farm or individual family type of rubber planting is the most economical kind of rubber production. It certainly is best suited to both the temperment and the skills of the people of Latin America. Because rubber plantings take a few years before they begin yielding a cash income, however, government programs to encourage their establishment usually are necessary.

"In 1946, Dr. M. F. Barrus, former Extension Director of the Puerto Rico Agricultural Experiment Station, made a study of the problems in Central America, especially in Costa Rica. He found that:

"In general, small farmers have no interest in planting rubber on their own initiative because of the lack of knowledge of the plant, lack of money, lack of time, and the uncertainty of a profitable market."

"Since rubber is not a food, there is also the absence of that appeal.

"This attitude is understandable, especially if we recall how long it was after successful plantations had been established in the Far East before native growers of that area began planting the crop. Therefore, stimulation, financial help, and continued guidance during the first five years of the planting are absolutely necessary.[4] This is also the conclusion of Latin American Government officials and representatives of the United States Department of Agriculture in the various countries. Not until a few pioneer small-farm plantings in each district are actually producing rubber, which finds a ready market and is sold at a profit, can we expect an industry of this type to develop and expand under its own initiative.

"Although many hundreds of growers in the various countries have planted small acreages of rubber with material supplied by experiment stations, the proportion of successfully established areas in the cooperating countries varies from total failure to a high percentage of expertly managed and very successful projects. Success depends on proper selection of growers, effectiveness of follow-up inspections, and absence of unusual hazards or circumstances.

"Hitherto, it has not been desirable to encourage rapid expansion of planting, because the research program had not developed thoroughly satisfactory material or procedures. The aim has been to go slowly and if possible make a success with the limited number of growers who could be guided adequately. It is believed that once the trees on these places are producing a satisfactory income, other growers will want to plant rubber and that the area planted will gradually increase. This slow development has the advantage of being based on an economic foundation. It has the further advantage of using improved clones and practices as these are discovered. It avoids the losses that have come in some cases from plantings made by a large number of individuals having insufficient knowledge or skill with such a crop.

"Promising new districts and localities where no single rubber planting yet exists should be considered along with completion of the 'community programs' or patterns already started. Acceleration of planting should be successful if growers are assisted in one of the following ways, in addition to providing a qualified inspector to make monthly or bimonthly visits to instruct and advise them regarding planting, intercropping, pruning, and tapping the trees:

"1. Provide trees gratis or for a small sum.

"2. Subsidize growers with a stipulated sum from the time the trees are planted until they are five years old.

"3. Grant loans through local agricultural credit banks or associations in an amount sufficient to carry the expenses. The loan with interest would be amortized gradually after, say, the sixth or seventh year, allowing the fifth year in which to get started with tapping.

"4. Encourage growers to meet the expenses of bringing the trees to bearing. Farmers with limited means would necessarily plant a relatively small area and would endeavor to meet cash costs from the sale of intercrops.

"In general, it is obvious that for colonization projects the inclusion of rubber will require limited financing by governments under the first three methods. These are now accepted alternatives in most of the countries and require the maintenance of national nurseries to produce and distribute the budded trees of high yielding strains. In nearly all cases these operations, as well as the specialized technical guidance and extension follow-through, are under the control of the cooperative station to which rubber experts of the United States Department of Agriculture are assigned.

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[2] Principal agriculturist, U. S. Cooperative Rubber Plant Field Station, Turrialba, Costa Rica.

[3] June, July, August, 1942, and July, 1947.

[4] Cooperating governments, companies, and individual growers have been spending collectively nearly $2 million annually on their rubber projects.

Future of Natural Rubber

"Before concluding this article, perhaps we should review an important question that is often asked:

"Will not synthetic rubber drive natural rubber out of the market in the near future?

"Of course, no one can predict what research may bring forth. It seems fairly certain, however, that there will always be a market for both types provided the price is favorable. In an expanding world economy, especially among the teeming millions of the Far East, the day may not be far off when the present planted areas of *Hevea* rubber may not produce enough to meet the demand.

"For any immediate consideration of the question we can only refer to the considered judgment of the foremost authorities in the rubber manufacturing (consuming) industry. This may be summed up by stating that present synthetics cannot entirely replace natural rubber, even in an emergency. About 25% of total United States requirements must be natural rubber. In 1948 the United States used nearly 70% natural rubber, more than 90% of which was imported from the Far East—from areas of recurring economic or political unrest. These factors make stockpiling imperative. This is costly and complicated in procurements and stock rotations. Therefore, an appreciable production of natural rubber in the Western Hemisphere will be of strategic importance to the United States.

"For Latin America, the problem of synthetic *versus* natural rubber has other facets. Most countries do not feel that they can invest the necessary millions of dollars in facilities for synthetic production, although domestic requirements are rapidly expanding. They must use scarce foreign exchange to import either synthetic or natural rubber. For example, Brazil manufactured only 236,189 tires in 1940, while in 1948 it produced approximately 1,000,000. Therefore, the policy of the larger countries at least is to produce natural rubber and, if it proves profitable, to expand for export.

"The same incentive, but to a lesser extent, prevails among the smaller countries—especially those of Central America—which have only a small internal rubber requirement. For these, the production for export is the prime consideration, but there is as yet uncertainty about competition in the world market, the present threatened overproduction, and the unpredictability of the situation 10 or 20 years from now. Natural rubber production in any part of the world cannot be separated from economics. In this respect, extension work in countries developing *Hevea* rubber solely for the export market should be carefully thought out and executed."

Test Methods for Elastomers

(*Continued from page* 425)

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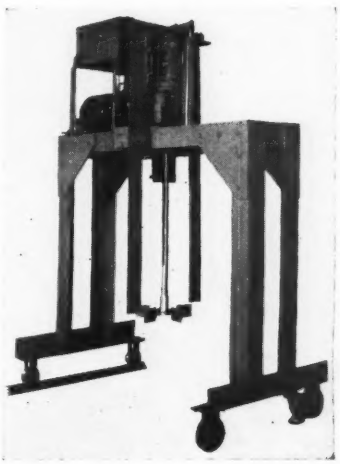
Movable Heavy-Duty Agitator

A NEW heavy-duty liquid agitator that can be moved quickly from one tank to another for batch mixing and blending has been announced by Mixing Equipment Co., Inc., Rochester, N. Y. The new Lightnin Agitator is a turbine-type unit containing all components necessary for complete and efficient batch mixing. Mounted on casters, it rolls on a track from tank to tank, as required, and will serve up to 40 tanks in any order desired. The correct mixing speed for each batch can be set quickly on the variable speed control. The impeller and its shaft are raised and lowered in the tank by hydraulic means. To switch from one tank to another, the operator merely sets two levers, releases a floor lock, and wheels the unit to its new position.



Lightnin Agitator Rolls on Track to Serve Many Tanks

The agitator is fitted with two integral baffles that raise and lower with the impeller. These baffles are designed to promote rapid and thorough mixing and eliminate the expense of attaching baffles to the tanks, with consequent cleaning problems. The unit is supplied in capacities up to 4.5 h.p. at the impeller, with the correct electric motor and impeller size recommended by the manufacturer to fit the application. The shaft, impeller, and baffles come in a wide variety of metals to suit individual requirements.

EDITORIALS

Two- Year Extension of Rubber Act of 1948 May Work Out Better Than Expected

ALTHOUGH action on rubber legislation in Washington, in June, extending the Rubber Act of 1948 for two years was complained of much as merely "freezing the status quo," and many in the rubber industry felt therefore that we were passing up a chance for progress, the recommendations of Sen. Lyndon Johnson of Texas, whose Armed Services subcommittee succeeded in reducing the extension from three to two years, and the recommendations of Sen. John Bricker of Ohio, who wrote the minority report on rubber legislation, indicate possibilities for further progress in synthetic rubber that have not been full explored under P. L. 469, which was written by Bricker originally. What is most important in this connection is continued aggressive participation by the rubber industry, during the next two years, in seeing that these new possibilities have their best chance of realization.

Johnson in his recommendation asked for a "continuing study" of the rubber program by Congress and another report on plant disposal by the Administration by April, 1951.

"There is reason to believe that progress toward the objective of a free, competitive synthetic rubber industry can be made under the present law. There is ample authority in section 7 of the Rubber Act of 1948 to lease Government-owned facilities to private industry," Johnson pointed out.

"Short term negotiated leases are not subject to the same objections from a security standpoint as disposal by sale, particularly in view of the lease restrictions required by section 7 of the Act. The Committee believes that the responsible agency of the Government should fully explore the possibilities and determine the advantages to accrue from short term lease or leases for one or more of the synthetic rubber plants now owned by the Government to see whether leases can be negotiated to the benefit of all concerned."

Bricker in his report, the wording of which is of special interest to the rubber industry, said:

"It was the judgment of the Committee on Banking and Currency, at the time of the enactment of the Rubber Act of 1948, that, given enthusiastic direction, the program envisaged therein would permit substantial strides to be made toward the creation and encouragement of a free, competitive synthetic rubber industry. Your committee feels that more substantial progress would be made toward that end, if private enterprise were encouraged to play a greater part in the development of the program."

Bricker noted that the wartime practice of patent pooling had been ended, but emphasized by inference, if not directly, that the important requirement for leasing GR-S copolymer plants to private industry must be solved in order that the commercial development of a new synthetic rubber could be carried out by an individual company without disclosing its operating "know-how" to its competitors. Ownership of a patent is of little value as long as the commercial development has to be worked out in copolymer plants to which competing operating companies have access as long as the plants are entirely under government supervision.

The Committee on Banking and Currency, Bricker added, is disturbed by the fact that, after eight years of government control of the industry, there has not been sufficient improvement in synthetic rubber as a result of domestic research.

If Bricker's interpretation of what constitutes mandatory usage for the operator of a leased copolymer plant is accepted by the Reconstruction Finance Corp., the way will be opened for tire manufacturers to develop and use to their own advantage new synthetic rubbers made by them in leased copolymer plants.

Under the law, production from a leased copolymer plant cannot be used to satisfy mandatory usage. The question is what is to be considered mandatory usage —the 200,000 tons' national security minimum of GR-S, or only, for example, the 160,000 tons specified under Rubber Order R-1 as it stands today? Bricker says that when the Senate Banking and Currency Committee wrote P. L. 469 two years ago, it meant the latter.

It is pointed out that if the controls require each tire contain 25% GR-S, the remaining may be natural rubber, GR-S, or any synthetic product of the tire manufacturer's own research, or any combination of these in any proportion he may determine upon. Obviously, unless this choice is afforded him, permitting him to attempt to excel his competitors, the manufacturer cannot be expected to exert all his efforts in the development of a better product.

It is within the area of voluntary usage thus created by the manufacturer's freedom of choice that the realization of the objective of legislation in this field must come, Bricker added. It is in this area that the nation will eventually be assured of an independence from the yoke of reliance upon an unreliable supply of natural rubber, and that the perplexing problem of disposal of the government's synthetic rubber facilities will be resolved once and for all, he concluded.

India RUBBER WORLD thinks that if the rubber industry will continue its active and aggressive participation in the solution of the synthetic rubber problem by helping Congress with its "continuing study" and the Administration with its plant disposal report of April, 1951, progress toward "the free, competitive synthetic rubber industry" will be made, if not by July 1, 1952, very shortly thereafter. Meanwhile the first requirement is the acceptance by the Commerce Department's rubber division of the Bricker definition of mandatory consumption so as to facilitate the leasing of copolymer plants.

DEPARTMENT OF
PLASTICS TECHNOLOGY

Fluid Heating and High-Temperature Cooling for Calenders and Presses

Paul L. Geiringer[2]

THE problem of heating plastics equipment has been approached from very different angles. Gas heating and electric heating have been used to some advantage in small plants and for certain processes. In general, however, the American plastics industry has hitherto used steam as the favorite heat carrier. Many serious difficulties have been encountered in the use of steam as the heating medium, and numerous methods have been tried to improve the heating system.

The same development also took place in Europe. In approximately 1919, however, an engineer of the I. G. Farben trust, which operated one of the first and largest plastic sheet plants in Troisdorf-Koeln, Germany, decided to try another heating medium in place of steam. As a result, he designed the first heating system using high-temperature water under pressure as the heating medium for the plant's numerous large platen presses. This was the first large high-temperature fluid heating plant.

Mr. Klingelhoefer, who designed this plant, took out the first patents and developed a system which is, however, at present completely superseded by a different design which my company is using. Nevertheless, the basic idea of using a high-temperature fluid as a heat carrier was first utilized by Klingelhoefer, and he experienced the great advantages offered by this new heating method. He approached the difficult problem mainly intuitively and experimentally and without any theoretical knowledge. It is only now, 30 years later, after considerable experience with fluid heating and after the work of such men as Jacob, McAdams, Nusselt, and Erk, that we are slowly beginning to understand theoretically the great advantages offered by fluid heating as compared with steam heating.

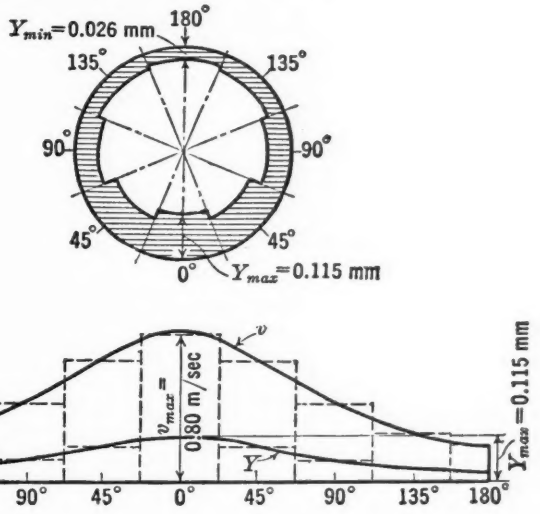


Fig. 1. Thickness and Velocity of Water Film Inside a Horizontal Tube in Which Flowing Saturated Steam Is Condensed. Scale of Water Film Thickness Is 30 Times That of Tube Diameter[5]

TABLE 1. COMPARISON OF STEAM AND HYDROTHERM LIQUID HEATING SYSTEMS WITH REGARD TO ENGINEERS' REQUIREMENTS FOR PLASTICS EQUIPMENT

Requirements of Plastics Engineer:	Steam System	Hydrotherm Liquid System
(1) Uniformity of equipment surface temperature.	(1) ±10—15° F.	(1) ±2° F. or better.
(2) Simple and efficient cooling system.	(2) a. No temperature control. b. Fluid change needed for cooling. c. Scale formation.	(2) a. Accurate control. b. Same fluid used for cooling c. No scale formation.
(3) Automatic operation.	(3) Unobtainable in steam-water system.	(3) Fully automatic operation attainable.
Requirements of Plant Engineer:		
(1) No peak load on boilers.	(1) No solution feasible.	(1) Fluid accumulator solves the problem.
(2) Maximum overall heat transmission efficiency.	(2) Condensate, flash-out, and other losses equal 25-40%.	(2) Unused heat returns to boiler. Losses depend on type of system.
(3) Minimum maintenance work.	(3) Maintenance of reducing and condensate valves; replacement of condensate pipes; scale removal.	(3) Circulation pumps require negligible maintenance. Pipes have infinite life-time.

Requirements of a Heating and Cooling System

The plastics engineer has three basic requirements insofar as a heating and cooling system is concerned:

(1) The heating system must maintain uniform temperatures over surfaces of considerable extent. The temperatures used for the past 10 years have been between 200-400° F. For a number of plastic materials, at present, this temperature has risen to 500-600° F. and, in some cases, as high as 700° F.

(2) In addition to high-temperature heating, the cooling of plastic materials is of equally great importance. The elimination of heat contained in the material or the metallic equipment, and of heat created by friction, such as in calenders, has become an important and difficult problem.

(3) Another important requirement is that the heating system be designed to operate fully automatically in a preset cycle, independent of the skill of the operator.

The plant engineer also has three basic requirements for a heating and cooling system, as follows:

(1) The heating system should operate without peak loads, and should not place any sudden shocks on the boilers.

(2) The overall efficiency of heat transmission between boiler plant and heating equipment should be favorable.

(3) The system should require a minimum of maintenance work.

When these requirements of the plastics and plant engineers are considered, it must be said that both groups are disappointed in the fulfillment of their requirements with the use of steam as a heat carrier. In addition to these factors, the steam system does not lend itself to gradual heating. This condition is of utmost importance in certain processes where the material may be destroyed by sudden heating and consequent rapid evaporation of water. I venture to say that practically none of these requirements can be satisfied by steam heating, but can be fully satisfied by use of fluid heating.

Fluid Heat Carriers

For temperatures up to 450° F. we found it practical to use water under pres-

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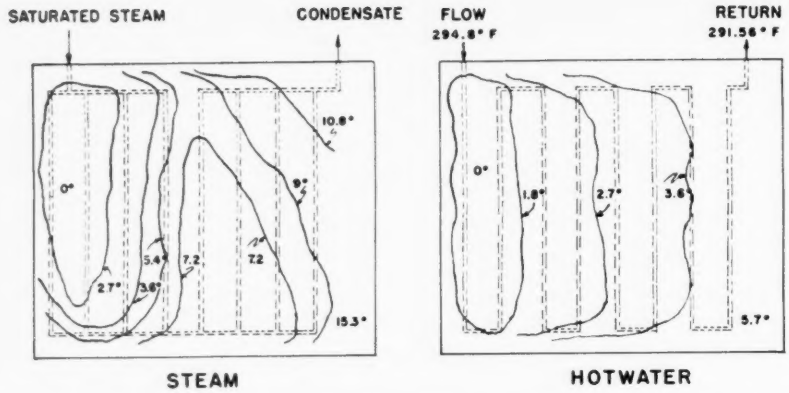


Fig. 2. Temperature Differences on Press Platens Heated by Steam and Hot Water[2]

sure as the heat carrier. Between 400-700° F. we use a heat transfer fluid that remains in the liquid state at that elevated temperature and at 760 millimeter pressure. One fluid, Hydrotherm 500, is a chlorinated biphenyl which permits use of temperatures up to 550° F. Another fluid, Hydrotherm 700, is an aryl silicate and permits use of temperatures of 650° F. and even higher. Dowtherm in the fluid phase may also be used as the heat transfer liquid.

Comparison of Steam and Fluid Heating

To simplify matters, Table 1 shows the demands of the engineers operating plastics plants, and how far they may be satisfied with either steam or fluid heating.

Uniformity of Surface Temperature

Most engineers believe that it is easier to heat a surface uniformly by means of steam than by means of a hot liquid passing through the equipment. They reason as follows. Steam condenses at a constant temperature; therefore, the equipment temperature should be uniform. In order to transmit heat by means of liquid there must be a temperature difference between the incoming and the outgoing liquid; therefore, the temperature of the surface cannot be uniform. This reasoning seems rather obvious, but it is basically erroneous.

It is true that steam condenses at a uniform temperature if kept at the same pressure, but this does not mean that the heat transfer is uniform. On the contrary, the heat transfer is very non-uniform. The investigations of Nusselt,[3] Erk,[4] and Eck,[5] all conducted in cooperation with Max Jacob, and finally the work of Jacob himself in 1936[6] have shed some light on this problem. I refer particularly to the recent book by Professor Jacob,[7] from which one illustration is reproduced in Figure 1.

This figure gives the results of measuring the heat flow of condensing steam vapors in a horizontal tube, as determined by measuring the temperature at different angles to the horizontal axis of the tube while rotating the tube around the axis. In these tests the temperature at the bottom of the tube was found to be much less than at the top because of the increase in water film thickness from the top to the bottom of the tube. The flow of condensate in the axial direction also caused an increase in film thickness in the direction of flow.

As shown in Figure 1, the film thickness at the top of the tube was only one-fifth the thickness at the bottom. The upper diagram represents the velocity of the film, while the lower shows the film thickness. These film thicknesses were calculated and also measured by actual tests and found to be accurate. While passing over the formulae and mathematics involved, I can assure you that the same temperature gradient has been found in measuring surface temperatures on platen presses.

Figure 2 shows the results of measuring surface temperature on steam-heated platens. It can be seen that the temperature differences on the platen surface is 15° F. and higher. Most people with practical experience on plastics equipment will know that even greater temperature differences have been observed on platen presses, and that the top surface of a platen is considerably hotter than the bottom surface.

Platen presses using fluid heating can operate with considerably smaller temperature differences and may have a surface temperature of ±2° F. The heat transfer coefficient of fluids is uniform all around the bore of the platen.

Figure 3 shows an actual test of a surface heat distribution on a platen heated by Hydrotherm, and it can be seen that a considerably smaller temperature differential has been registered. I am sorry that these measurements have not been extended to the bottom of the platen.

The same results in surface temperature uniformity have been obtained on plastics calenders with drilled rolls. We have calenders in operation where we guaranteed a surface uniformity of ±1° F. You may ask how such a uniformity can be measured. The company ordering this plant was interested in obtaining very close temperature control, and we were able to prove, by means of an electric differential temperature gage which measured temperatures of 0.01° F., that the surface temperature did not vary more than 0.7-1.0° F. Such uniformity is completely unobtainable with steam heating.

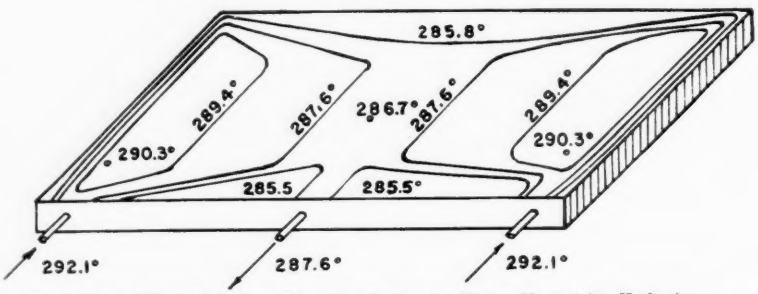


Fig. 3. Actual Test of Surface Heat Distribution on Platen Heated by Hydrotherm

Fig. 4. Layout for Fluid Heating and Cooling of Calender Rolls by Hydrotherm

[3] W. Nusselt, *Z. Ver. Deut. Ing.*, 60, 541, (1916).
[4] M. Jakob and S. Erk, *Forsch. Gebiete Ingenieurw.*, 310, 1 (1928).
[5] M. Jakob, S. Erk, and H. Eck, *Z. Ver. Deut. Ing.*, 72, 1517 (1929).
[6] M. Jakob, *Mech. Eng.*, 58, 729 (1936).
[7] M. Jacob, "Heat Transfer." Vol. 1. John Wiley & Sons, Inc., New York, (1949).
[8] *Ibid.*, From Fig. 30-5, p. 683.
[9] K. Bormann, *Arch. Warmewirt.*, 24, 169 (1943).

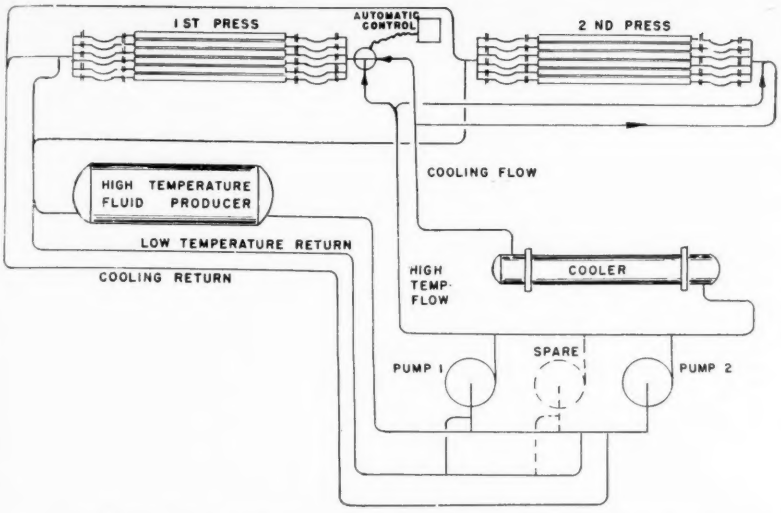


Fig. 5. Layout for Fluid Heating and Cooling of Platen Presses by Hydrotherm

Simplicity and Efficiency of Cooling

The second requirement of the plastics engineer is for simple and efficient cooling. For many processes, such as thermosetting molding, quick and uncontrolled cooling with fluid of any low enough temperature is acceptable. There are, however, other cooling processes, such as in the production of plastic sheets, where heat must be eliminated at a certain rate; yet a uniform high temperature must be maintained. Carefully controlled cooling is necessary in such cases. It is not possible to use direct cold water since it is required that the flow and temperature of the water be closely controlled.

Figure 4 shows how we have solved this problem in heating and cooling calender rolls. You will see that we have two fluid circuits: one passing through a heat source, which may be a heat exchanger or a boiler; and the other passing through a cooler. Both circuits carry water of different temperatures, and the two water streams are mixed in front of each roll in accordance with the heat requirement of the roll. The temperature of the water being admitted to each roll will depend on whether that roll is being heated or cooled.

This illustration shows a rather simple layout since more circuits are sometimes needed. We have installations in operation both here and abroad which are fully automatic. They maintain the roll temperature in tolerance of only 1° F., and it is possible to set the temperature of the different rolls as close together as 3° F. or as far apart as 30-50° F.

Automatic Operation

The automatic maintenance of cooling temperatures and automatic switching from cooling phase to heating phase is possible only if one heat carrier is used. No automatic control can be devised if steam is used for heating and water for cooling. Figure 5 shows a layout for a platen press where the whole process of heating and cooling is automatically controlled by one instrument which switches over the circuit from the heating to the cooling phase. In this way it is possible to have an absolutely uniform product independent of the ability of the operator.

Last but not least, it must be noted that cooling with fresh water in an open circuit causes considerable scale deposit in the equipment and often results in taking the equipment out of service.

Shock Loads

Shock loads caused by the sudden heating up of platen presses and calenders are rather disturbing. With steam they cannot be eliminated, since the design of steam accumulators would require higher boiler pressures and entail fantastic costs. If high-temperature fluid heating is used, the accumulation problem becomes rather simple. Accumulators operating at a uniform pressure are utilized and reduce to a minimum the peak load created, for example, by the sudden heating up of presses.

Heat Transmission Efficiency

The efficiency of steam heating for plastics equipment is rather low. If one considers, for example, that the condensate leaves the equipment at a temperature close to that of the steam 350° F., the condensate and flash-out losses are rather high. Much equipment on the market endeavors to reduce these losses. This equipment must be excellent indeed if it is to compete with a fluid heating system that has practically no losses and where all the unused heat is returned to the boiler.

The peak of efficiency can be obtained in installations providing for heating only. In installations where heating and cooling must be considered, some losses must be accepted because some of the water contained in the circuit is subjected to the cooling process together with the equipment. These losses, however, are insignificant when compared to the advantages gained.

Maintenance and Other Requirements

Steam heating requires the maintenance of numerous reducing and condensate valves and traps. Fluid heating needs only the supervision of some pumps, and experience has shown that this maintenance is rather negligible.

The power costs for operation of the fluid heating system are comparatively low. It is difficult to give any figures on power costs, but certainly these costs can be kept at a level where they may be disregarded in the operation costs.

Summary and Conclusions

The advantages of a high-temperature fluid heating and cooling system have been described in comparison with steam heating and water cooling systems. Some 25 of the largest plastics companies in Europe have installed fluid heating in their plants, and we feel sure that fluid heating offers the plastics industry such great advantages that it will be used to a greater and greater extent to the benefit of the industry.

SPI Film and Sheeting Conference

THE first Plastics Film, Sheeting, and Coated Fabrics Conference, sponsored by the Society of the Plastics Industry, Inc., was held May 25-26 at the Hotel Commodore, New York, N. Y. Approximately 400 members and guests attended the two-day program, which emphasized merchandising and manufacturing developments and featured morning sessions followed by luncheon meetings.

Doings on Thursday, May 15

The opening morning session, presided over by George A. Fowles, B. F. Goodrich Chemical Co., began with a brief talk on SPI activities by William T. Cruse, executive vice president of the Society. The remainder of the session was devoted to the presentation of two papers: "Trends in Calenders and Calendering," Donald C. Chase, Farrel-Birmingham Co., Inc.; and "Vinyl Stabilizers," H. J. Ratti, National Lead Co.

Mr. Chase discussed trends in the development of machinery for making calendered vinyl film, including weighing and blending, calendering, embossing, and wind-ups. There is greater use of automatic equipment for weighing and measuring out the ingredients, and recent installations are based on working the materials in a Banbury mixer and discharging on to a belt conveyer, which moves the material to a mill for added working and blending, especially when high-speed calendering of heavy-gage sheeting is to be performed. The trend in calenders is toward the high-speed "Z-type" incorporating a roll crossing device. Factors influencing high-speed calendering, particularly temperature control and roll positioning, were also considered by the speaker. Mr. Chase concluded with a discussion of methods for obtaining a frosted finish on the final calender roll, use of a calender for embossing, and problems presented in film or sheet wind-ups.

Mr. Ratti noted that the choice of a vinyl stabilizer depends on the plasticizer used in order to prevent premature plasticizer breakdown. In discussing lead stabilizers, the speaker noted that highly basic lead stabilizers are excellent for use with organic ester and polymeric type plasticizers. Highly basic lead salts are unsatisfactory for compounds containing appreciable amounts of inorganic ester-type plasticizers, particularly the aryl phosphates. Lead silicate-silica gel complex stabilizers with small amounts of normal lead salicylate are indicated with such pasticizers, as well as with oil-type plasticizers.

The luncheon meeting, with Frank J. Groten, Firestone Plastics Co., acting as chairman, began with a talk on "The Style Approach to Plastic Fabrics" by David Silman, Cohn-Hall-Marx Co. Mr. Silman emphasized the importance of proper styling in creating consumer demand for vinyl film and sheeting products and thereby eliminating "boom or bust" production cycle problems.

The balance of the session was given over to progress reports from the 11 technical subcommittees of the SPI Plastics Film, Sheeting, and Coated Fabrics Division. These progress reports have been published in a booklet issued by the Society.

Events on Friday, May 26

Three papers were presented at the morning session presided over by Albert J. Hanley, Respro, Inc., as follows: "A Review of Vinyl Printing," Chester M. Robbins, Interchemical Corp.; "What the Furniture Manufacturer Expects of Vinyl Types of Upholstery Materials," J. W. Brenner, William Brenner Furniture Corp.; and "Plasticizers for Vinyl Film and Sheeting," M. C. Reed, Bakelite Division, Union Carbide & Carbon Corp.

Mr. Robbins's talk was a review of the different methods of printing on vinyl film and sheeting. Methods discussed and compared included gravure printing, textile or drum machine printing, unit-type machine printing, surface or wallpaper printing machines, silk screen printing, hand printing, transfer printing, and aniline printing.

Mr. Brenner stated that instead of overselling vinyl upholstery, the vinyl manufacturers should educate the furniture manufacturer and dealer as to the merits and proper use of vinyls in the different available qualities and gages. The speaker urged the use of informative labeling and eliminating the use of lightweight gages and inferior qualities.

Dr. Reed gave permanence, stability, and freedom from objectionable odor as the prime requirements for a plasticizer for vinyl resins. Specific applications often require specific properties, and no one plasticizer combines all of these properties to a degree sufficient to satisfy all uses. The speaker concluded with a discussion of available plasticizers, classified according to chemical types, and the properties which they impart to vinyl film and sheeting.

Three papers were also given at the luncheon meeting, with Paul Terretta, O'Sullivan Rubber Co., Inc., in the chair. These papers were: "Vinyl Film, Limited —or Unlimited?" Howard S. Bunn, Bakelite Division; "The Impact of Informative Labeling on Sound Merchandising," Elmer H. French, Firestone Plastics; and "Gaining Respect through Self-Respect," Sidney L. Chambers, Comprehensive Fabrics, Inc.

Mr. Bunn said that the question now facing the vinyl film industry is whether business is limited to present levels, or whether its future is still unlimited. The major deterrents to continued growth are emphasis on price and price alone, which results in lowered quality standards, and misapplication of film compounds and gages. Of the 38 domestic producers of vinyl film, seven are high-quality producers who do 48% of the business at the highest prices; 14 are competitive quality producers who do 39% of the business at competitive prices; and 17 are marginal suppliers of highly varying qualities of film who do 13% of the total business volume.

Mr. French discussed the importance of informative labeling in stimulating sales and noted that the SPI handbook on informative labeling is expected to be published in October. This speaker stated that a suitable label must include the following points about the product: what it is used for; what it will do; what it is made of; how it is made; how to take care of it; and the guarantee, if desired.

Mr. Chambers said that a respected trade name is the best insurance against cutthroat competition. If you respect your own product by maintaining its quality and guarding against its misuse, the consumer will not only respect you, but will also repay you. The steps in achieving self-respect were given by the speaker as follows: (1) use your product only where it does the job better than others; (2) tailor your compounds to meet end-use requirements; (3) check samples of each product to assure quality maintenance; (4) observe sound merchandising and pricing policies; and (5) avoid exaggerated claims or misleading statements in advertising.

Plastics Developments before SPE Section Sessions

A TALK on "Steels for Plastic Molds," by George E. Brumbach, Carpenter Steel Co., featured the June 21 dinner-meeting of the New York Section, Society of Plastics Engineers, held at the Hotel Shelburne, New York, N. Y. Approximately 65 members and guests attended the meeting, the last before the summer recess.

Mr. Brumbach stated that the development of steels for mold cavities has paralleled the growth of the plastics industry. In the early days of molding, most cavities were machined from a good grade of machinery steel, or cold hobbed from a pure low-carbon iron. These steels had decided limitations and were soon replaced by three alloy steels, as follows: Steel A —contains 0.10% carbon, 0.50% manganese, 0.60% chromium, and 1.25% nickel, and has much greater strength and resistance to upsetting in service than hobbing iron; Steel B—contains 0.10% carbon, 0.40% manganese, 1.50% chromium, and 3.50% nickel, is designed for large machined cavities requiring high core strength and good abrasion resistance, and is not applicable for hobbing; and Steel C —contains 0.90% carbon, 1.60% manganese, and 0.25% silicon, is a through-hardening steel that can be hardened in intricate sections requiring size accuracy, and is used principally for machined cavities.

When it was discovered that certain molding compounds were corrosive, Type 420 stainless steel, called Steel D by the speaker, was added to the group of mold steels. Most cavities are machined from this steel, but a limited amount of hobbing can be done after special annealing. During the past two or three years, two more mold steels have been developed: Steel E—contains 0.10% carbon, 0.30% manganese, 0.20% silicon, and 2.50% chrome, and is an improvement over Steel A in that it can be hobbed to a greater depth, has higher core strength, and can be oil hardened; and Steel F—contains 0.10% carbon, 0.30% manganese, 0.20% silicon, 5.00% chromium, 0.90% molybdenum, and 0.25% vanadium, has high core strength, can be cold hobbed to a certain degree, and retains its properties at operating temperatures up to 800° F.

Table favors were distributed through the courtesy of Plaskon Division, Libbey-Owens-Ford Glass Co., and the meeting closed with a drawing for door prizes contributed by Noma Electric Corp., Washington Molding Co., and Wess Plastic Molds, Inc.

Powers Discusses Recent Developments

A talk on "Recent Developments in Plastics" by P. O. Powers, Battelle Memorial Institute, featured the May 22 dinner-meeting of the Cleveland-Akron Section. Some 42 members and guests attended the meeting, which took place at the Garden Grill, Akron, O.

Dr. Powers noted that 1949 plastics production was the largest in history, with 1,200,000,000 pounds of plastics and 500,000,000 pounds of surface coating resins produced. Accurate production figures for plastics materials are becoming difficult to obtain because plastics are being used in many related fields, but an increase in production in the coming years is almost inevitable. Carefully considered estimates show that 2,500,000,000 pounds of plastic materials will be produced in 1952. The speaker stated that coal-tar chemicals are no longer sufficient to meet the raw materials demands of the plastics industry, and that the demand for petro-chemicals in the plastics field is becoming a significant factor in the petroleum industry. Dr. Powers concluded his talk with a brief review of recent developments in plastics applications, materials, and fundamental theoretical work.

Panel Discussion at Chicago

A panel discussion on problems of plastics manufacturers featured the June 14 joint dinner-meeting of the Chicago Section, SPE, and Midwest Chapter, SPI. Approximately 100 members and guests of the two groups were present at the meeting in the Builders' Club, Chicago, Ill. Wm. L. Hess, Anesite Co., acted as moderator of the discussion, and panel members were Wm. Gobeille, Nash-Kelvinator Corp.; Carl F. Massopust, General American Transportation Co.; H. S. Ruekberg, Elmer E. Mills Corp.; and C. Robert Webster, consulting engineer.

The place of statistical quality control in the plastics molding industry was the subject of the discussion led by Mr. Gobeille. He described the results that can be obtained by use of statistical quality control methods, and the advantages of establishing standards on tolerances obtainable with certain molding machines. It was indicated that molding jobs running only two or three days were not adaptable to quality control methods.

Mr. Massopust led a discussion on problems facing the compression molder. He pointed out that the many changeovers being made from compression to injection molding indicate that new methods and techniques are needed for compression molding. Injection molds are less costly than compression molds: production is faster; thermoplastics are relatively low in cost and have improved color; and injection machines have undergone rapid development. A similar advance in compression molding is needed to offset the trend to injection molding.

Mr. Webster discussed multiple-screw and single-screw extrusion machines, with emphasis on the new Italian Columbo twin-screw extruder. This machine is claimed to be a combination compounder and extruder and differs from American machines in that its two screws intermesh. The volumetric efficiency of intermeshing twin-screw extruders is said to be 60%; whereas non-intermeshing twin-screw machines are rated at 30% efficiency, and single-screw machines at 12% efficiency.

The use of restricted gating on large moldings was discussed by Mr. Ruekberg, who declared that an important factor in successful application of pin-point gating is proper design of runners. It has been found necessary to use full round runners which extend into both mold plates so that an "insulating sleeve" of plastic is formed around the edges of the runner and effectively reduces the heat lost to the metal mold.

The two groups have announced plans to hold joint golf outings on August 4 and September 22 at Skycrest Country Club, Libertyville, Ill.

Holds Dinner-Dance

Instead of a regular meeting, the Western New England Section held a dinner-dance on May 3 at the Hotel Sheraton, Springfield, Mass. Approximately 100 couples attended the function, which included a dinner and floor show, followed by an evening of dancing. Door prizes were distributed to the wives of winning ticket holders. The evening was considered a great success, and plans are being made to make the event an annual affair.

200-Ounce Injection Machine

A 200-OUNCE injection molding machine, claimed to be the world's largest, was unveiled by New Jersey's Governor Alfred E. Driscoll at a ceremony on June 15 at the plant of A. L. Hyde Co., Grenloch, N. J. Opening a new era in molding, the machine is capable of pressing out thermoplastic products weighing approximately 200 ounces and will be used for the molding of television and radio cabinets, refrigerator door linings, kitchen cabinet doors, washing machine agitators and tubs, drawer sections for desks, outdoor display signs, and other large parts.

Designed and manufactured by Watson-Stillman Co., Roselle, N. J., the injection machine weighs 115,000 pounds, has a nozzle pressure of 21,000 p.s.i., and is operated by a 60-h.p. motor. Platens are 60 by 40 inches in size and have a 54-inch daylight opening. The hopper holds 300 pounds of molding material, and the clamping capacity is 1,000 tons. The machine is 24-2/3 feet long, five feet wide, and 12 feet 11 inches high.

Standard for Plastic Tile

THE first commercial standard for polystyrene plastic wall tile has been announced by the Commodity Standards Division, National Bureau of Standards, Washington, D. C. Identified as Commercial Standard CS 168-50, "Polystyrene Plastic Wall Tiles and Adhesives for Their Application," the standard is effective July 15. Preparation of the new standard was instigated by the Society of the Plastics Industry, Inc., more than two years ago, and it will be of material assistance to purchasers of wall tile.

The standard covers methods of test, materials, workmanship, tolerances, thickness, opacity, internal stress, color fastness, and other detailed requirements. A standard procedure and important considerations and materials in connection with tile installation and maintenance are also given, together with requirements for the adhesive used in installing the tile.

Polyethylene Film as Liner Material

ONE of the most important changes in the rubber industry from the plastics viewpoint is the application of polyethylene film as a liner material on camelback, cushion, and repair materials. In fact, almost every place where Holland cloth, varnished cambric, or polyvinyl alcohol film has been used as liners, polyethylene in a variety of forms is now the accepted material, according to Bert Marsh, Plax Corp., Hartford, Conn.

Approximately 18 months ago the rubber industry began a concentrated search for a cheaper and more satisfactory liner material than those being used. A great many types of coated and laminated paper products were tried; then the plastics field was combed until polyethylene was found to be the best possible solution. Of course many problems were encountered with polyethylene, but these were gradually solved through the complete cooperation of the rubber and the plastics industries.

The difficulties encountered with polyethylene can be summarized as follows: greater stretch of the film; unevenness of gage; tendency to wrinkle; and a slight reduction in tack. New winding techniques and embossing the film at the extruder head have greatly reduced stretching, although embossing to the close tolerances required by the rubber companies, necessitated more accurate gage control than was previously standard within the plastics field. The tendency to wrinkle and the possibility of entrapping air, when the rubber was applied to the film, were also partially overcome by the embossing operation. Besides the altering of the usual manufacturing procedure to accommodate the new film, slight changes in compounding were also found necessary to maintain the necessary quality of tack.

In several plants the technique of calendering rubber on to the liner required processing through a water bath. This eliminated polyvinyl alcohol film which is water soluble. Both Holland cloth and, to a lesser degree, varnished cambric absorbed moisture in this operation, thus making final stripping exceedingly difficult. This disadvantage is great where shipside or outdoor storage of camelback is required, but is an additional inducement in favor of moisture stable polyethylene.

A final factor in favor of polyethylene is the saving in cost over all other liner materials. Polyethylene film sold for 83¢ a pound, including color and embossing charges, while Holland cloth was $1.18 a pound. There are, moreover, 5.3 yards of polyethylene film per pound, as compared with 3.2 yards of Holland cloth. This saving is one that is worth solving production problems, especially when a company normally consumes 150,000 to 200,000 pounds of the plastic liner per year.

G-E to Expand Plastics

PLASTICS division, General Electric Co., Pittsfield, Mass., is about to launch a million-dollar improvement program to make its Taunton, Mass., plant one of the largest plastics operations in the country. According to Herbert M. Brusman, division manager, plans are being made to alter nearly all interior sections of the Taunton plant and to modernize equipment for maximum production efficiency. The alterations are to begin in July and are scheduled for completion some time near the end of the year.

The manufacture of all molds used in plastics production at the company's Taunton and Decatur, Ill., plants will be consolidated in a larger and improved tool room at Pittsfield. The transfer of molding equipment to Taunton will also make room at Pittsfield for the eventual expansion of several chemical manufacturing activities, including the molding of silicone rubber and the production of magnesium oxide and plastic resins and compounds. All consolidating moves are being planned and timed to insure no interruptions of service to customers.

New Vinyl Stabilizers

THE new stabilizers for vinyl plastics, "Dutch Boy" Plumb-O-Sils C and D, have been announced by National Lead Co., 111 Broadway, New York 6, N. Y. The new products are coprecipitates of lead orthosilicate and silica gel, and are characterized by easy dispersion in vinyl compounds. Used primarily in translucent stocks, they impart heat and light stability to vinyls, particularly those of vivid colors or deep shades.

National Lead also announced an expansion to full production of "Dutch Boy" Dyphos (dibasic lead phosphite), another vinyl stabilizer. Dyphos is used in opaque vinyls where exceptional heat and light stability is required. All National Lead vinyl stabilizers are manufactured in the company's Philadelphia, Pa., plant.

Powell Receives Hyatt Award

THE John Wesley Hyatt Award for distinguished achievement in plastics was presented to George M. Powell, III, technical head, vinyl coatings research, Union Carbide & Carbon Corp., South Charleston, W. Va., at a banquet on June 1 at the Hotel Pierre, New York, N. Y. The presentation address was given by Secretary of the Treasury John W. Snyder, and Waldemar Kaempffert, science editor of *The New York Times*, made the award to Mr. Powell at the ceremony.

The award, a gold medal and $1,000 in cash, was presented to Mr. Powell for his work in planning and directing the development, formulation, and application of Vinylite dispersion resins. He was primarily responsible for the development of a method that makes possible the use of high polymers in high solids dispersions in combination with inexpensive thinners. A graduate of Columbia University, Mr. Powell joined Union Carbide in 1933 and engaged in research on surface coatings. He was appointed to his present position in 1944.

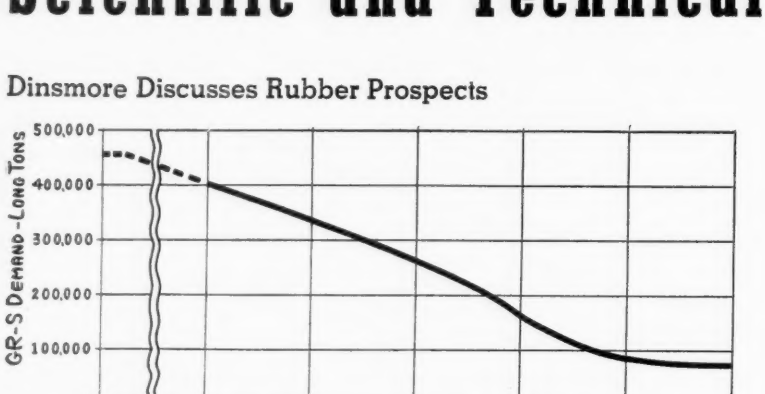
To Build Vinylite Plant

PLANS have been completed by Bakelite Division, Union Carbide & Carbon Corp., 122 E. 42nd St., New York 17, N. Y., for construction of a new plant at South Charleston, W. Va., to produce Vinylite dispersion resin VYNV.3. According to James W. McLaughlin, president of Bakelite, the new plant will be built and operated by the Carbide & Carbon Chemicals

(*Continued on page 458*)

Scientific and Technical Activities

Dinsmore Discusses Rubber Prospects



Graph Presented by Dr. Dinsmore on Estimated Effect of Price on Free GR-S Demand (Based on Total New Rubber Use of 1,000,000 Long Tons per Year)

A TALK on "Rubber Prospects" by R. P. Dinsmore, vice president in charge of research and development, Goodyear Tire & Rubber Co., featured the May 2 dinner-meeting of The Los Angeles Rubber Group, Inc. Approximately 160 members and guests attended the meeting, which was held in the Hotel Mayfair, Los Angeles, Calif. The dinner-meeting was preceded by an afternoon technical session at which reviews of several papers presented at the recent Rubber Division meeting in Detroit were given by Ray Bitter, B. F. Goodrich Chemical Co.; J. Larkin, Patterson-Ballagh Division, Byron-Jackson Co.; and R. Abbott, R. D. Abbott Co.

Dr. Dinsmore noted that the political turmoil which has existed since the end of the war with Japan has exceeded the expectations of most people. The resulting continued diversion of wealth and manpower all over the world to military purposes is a factor which makes the analysis of industrial trends difficult, if not impossible. Some of the potential new uses for rubber noted in 1944, such as latex sponge and use in farm, earth-moving, and road-building equipment, are exceeding expectations. Others, such as rubber suspensions for automobiles and the use of rubber as a chemical raw material, have not developed.

Thus the fact that we have been running above normal consumption, as judged by experience from 1914-1940, does not necessarily lead to the conclusion that we are due for a period of submormal activity, Dr. Dinsmore said. World excess use of rubber over the 1914-1940 figures is about 650,000 tons, of which this country accounts for about 450,000 tons. It is quite possible that the line of normal increase is changing its slope because of new rubber uses in this country and more industrialization abroad.

It would appear that we may expect a continued consumption of rubber in this country of 1,000,000 tons or slightly higher per year for several years to come. At the moment we are using rubber at a higher rate, but can expect some reduction in the last half of the year, the speaker declared. Foreign consumption should be about 900,000 tons this year, with an expected annual increase of 25,000 to 50,000 tons for the next two or three years. Transportation uses for rubber in this country, which was fairly constant at 70-75% before the war, has now dropped to about 65% despite the high level of automotive activity.

For rough calculation, if there is produced 1,550,000 tons of natural rubber, 900,000 tons of which are to be used by foreign countries, there remains 650,000 tons for the United States, Dr. Dinsmore said. Deducting 100,000 tons for stockpile use, we are left with 550,000 tons, against requirements of about 1,025,000 tons, or a deficit of 475,000 tons. We use about 50,000 tons of butyl, 30,000 tons of neoprene, 10,000 tons of nitrile types, and we import about 18,000 tons of styrene types, a total of 108,000 tons. This leaves 367,000 tons of GR-S and high-styrene type (10,000 tons) synthetic to be made in our government plants. Thus, regardless of price, there would appear to be a demand for about 30,000 tons a month of GR-S to keep up rubber goods production.

The effect of price on the relative demand for GR-S and natural rubber is obscured by several factors, the speaker said, such as mandatory use of GR-S, the shortage of natural rubber, and the fact that the rubbers are not competitive for all uses. If we assume a total rubber demand in this country of 1,000,000 tons a year and deduct neoprene, Butyl, and nitrile types, we have a demand for natural rubber and S-types of about 900,000 tons. It is probable that only about 450,000 tons of this would be competitive in a free market with ample supplies of both available; while the other 450,000 tons would go to natural rubber on a quality basis unless the price disadvantage became very large indeed.

Dr. Dinsmore presented the accompanying graph to show his view of the change in free demand for GR-S as its price varies from that of natural rubber. It will be seen that there is a sharp change in demand over the range where GR-S sells 2¢ below to 2¢ above the price of natural rubber. If this graph represents the actual situation, the private manufacture of GR-S might become a hazardous business if the crude rubber supply increased to its full potential, the speaker stated. Other factors would be possible cost reductions and quality improvements in GR-S. It will be difficult to transfer the GR-S industry to private hands until the need of compulsory use has passed, and this time may not come until there is an assured supply of enough natural rubber to meet all demands.

Dr. Dinsmore concluded his talk by repeating some of his views on the training of young rubber technologists, as given before the February 17 meeting of the Chicago Rubber Group.

Entertainment was provided during the dinner, and door prizes donated by the Group were won by Al Pickard, Braun Corp.; Howard Chamberlain and J. Bremble, Kirkhill Rubber Co.; W. J. Thomas and D. Tardoni, Firestone Tire & Rubber Co.; Harvey Dahl, Chili Products Co.; E. C. McLaughlin, H. M. Royal, Inc.; Robert Nemann, Commercial Rubber Co.; Mr. Bitter; Clint Booth, Glenn H. Taylor Co.; and Al Bruce, Ellay Rubber Co.

Rubber Division, A. C. S., Cleveland International Meeting

THE fifty-seventh meeting of the Division of Rubber Chemistry of the American Chemical Society will be held as a separate meeting in Cleveland, O., on October 11, 12, and 13, and will be international in character. The headquarters for the meeting will be the Hotel Cleveland.

A letter to members of the Division by C. R. Haynes, Binney & Smith Co., dated June 2, reports further on the acceptances received for English and European scientists who plan to attend this meeting and present papers. Besides the names of overseas guests found on page 192 of our May issue, this list now includes: M. Gordon, C. E. Kendall, D. H. Cooper, and D. J. McKeand, all of Dunlop Rubber Co., Ltd.; J. M. Buist, Imperial Chemical Industries, Ltd.; J. Dick, Imperial Chemical Industries (India); C. C. T. Sharp, agricultural director of the Rubber Research Institute of Malaya; R. G. Valdeman, Monsanto Chemicals, Ltd.; and Stefano Oberto, Pirelli Co., Milano, Italy.

The officers and directors of the Rubber Division again point out that they are extremely desirous that papers from the members in this country be on a par, both as to quantity and quality, with those of the guests. Abstracts of 400 words, in triplicate, must be in the hands of the Secretary by August 15. With these abstracts the name of the laboratory in which the work was done, the fact that the author or one of the co-authors is a member of the A. C. S., the name of the person who will deliver the paper, and the time desired for its presentation are requested.

F. W. Stavely, Division chairman, has appointed Amos W. Oakleaf, Phillips Chemical Co., chairman of the local committee, and Cecil A. Smith, N. J. Zinc Co., is vice chairman in charge of housing. In addition the general committee for the meeting includes E. H. Krismann, E. I. du Pont de Nemours & Co., Inc., registra-

tion; William Von Fischer, Case Institute, program; Henry F. Palmer, consultant, finance; R. F. Wolf, Columbia Chemical, publicity; F. A. Bonstedt, Sid Richardson Carbon Co., banquet; C. A. Hemingway, Witco Chemical Co., foreign liaison; and C. W. Christensen, Monsanto Chemical Co., advisory.

John M. Hamilton, Binney & Smith, is general chairman for the suppliers' cocktail party, with Allyn I. Brandt, B. F. Goodrich Chemical Co., as local chairman in charge of this event.

There will be the usual luncheon of the 25-Year Club at noon on Wednesday, October 11, presided over by R. P. Dinsmore, Goodyear Tire & Rubber Co.

The Division banquet will be held on Thursday evening, October 12, at the Hotel Carter.

The officers and directors of the Division emphasize that this meeting is being held at a very central location within easy access of a large number of technical men in the rubber industry, and that they are hoping for the largest turnout in the history of the Division of Rubber Chemistry.

Latex Anti-Webbing Agent

WEBNIX #33, an anti-webbing agent for liquid latex compounds formerly distributed through Latex Distributors, Inc., is now available directly from the manufacturer, Crusader Chemical Co., 4653 Manordene Rd., Baltimore 29, Md. The material is a milky white emulsion of especially selected components possessing foam destructive properties and blended to achieve maximum effect. Webnix contains 52% active ingredients, by weight, and 36% non-volatile components. The product is added to latex compounds in quantities of about 0.5-2.0 parts wet weight per 100 parts latex compound and is most effective shortly after being introduced into the latex compound.

New Plasticizers Offered

POLYCIZERS 162 and 332, two new plasticizers for use in vinyl and other synthetic resins as well as rubbers, are being distributed by Harwick Standard Chemical Co., 60 S. Seiberling St., Akron 5, O. These new products give good heat and light stability, excellent stress-strain properties, and good low temperature qualities, in addition to providing significant compounding economies, it is claimed.

Polycizer 332 is an odorless, practically colorless dioctyl adipate low in acid content. It imparts excellent low-temperature flexibility and good light and heat stability to vinyl and other resins and oil resistant rubbers when it is used alone or in combination with Polycizer 162. Polycizer 332 is also recommended for use as an entire or partial plasticizer in vinyl calendering, extrusion, molding, organosol, and plastisol processes. Compounds using Polycizer 332 in normal plasticizer quantities can be more highly loaded without exceeding hardness requirements.

Polycizer 162, dioctyl phthalate, is recommended as an all-purpose plasticizer for use with all types of resins. It is practically odorless and colorless and is said to give good heat and light stability, excellent stress-strain properties, and good low-temperature qualities.

Canadian Rubber Chemists' Meeting Held

THE meeting of the Rubber Chemistry Division of the Canadian Institute of Chemistry, held as a part of the meeting of the parent organization, took place in the Royal York Hotel, Toronto, Ont., Canada, on June 21 and attracted an attendance of between 80 and 90 members and guests of the Division. Abstracts of most of the papers presented were published in our May issue on page 192, but some further comment on these papers will be made. J. Ramsey, Miner Rubber Co., Ltd., chairman of the Division, presided at the technical sessions and at the business meeting of the Division, at which the following officers and directors were elected for the period July, 1950, to July, 1951: chairman, J. T. Black, Polymer Corp., Ltd., Sarnia, Ont.; vice chairman, N. W. Smith, Dominion Rubber Co., Ltd., Montreal, P.Q.; secretary-treasurer, T. L. Davies, Polymer Corp. Directors and members of the executive committee in addition to the above officers are: B. Marr, Naugatuck Chemical Co., Ltd., Elmira, Ont.; G. Stevens, Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.; and Eric Bolton, B. F. Goodrich Co. of Canada, Ltd., Kitchener, Ont.

The first paper given at the morning session, entitled "A Study of Styrene-Butadiene Copolymers," by E. B. Storey and H. Leverne Williams, Polymer Corp., presented a detailed study of these polymers ranging in composition from a 50:50 ratio of the two monomers to 10:90, i.e., 10 parts of butadiene and 90 parts of styrene. Physical properties of copolymers made at high and low conversion included data on tensile, modulus, elongation, tear and crack growth resistance, rebound, mill shrinkage, and extrusion characteristics. The improvement in physical properties obtained by blending three parts of GR-S with the copolymers was also shown. Variation in the temperature of polymerization from 41 to 104° F. did not seem to have any effect on the properties of these copolymers.

In his paper, "The Vulcanization of Neoprene," A. M. Neal, E. I. du Pont de Nemours & Co., Inc., mentioned first the several derivatives of mercaptobenzothiazole that were studied in a search for a new neoprene accelerator. The most satisfactory proved to be 2-mercaptoimidazoline, which when used in quantities as low as 0.25-part on 100 of polymer, proved to be an effective accelerator for neoprene. The effect of certain fatty acids used with this new accelerator, now designed as 2 MI, in the vulcanization of Neoprene Type W showed that salicylic was the most active, while oxalic acid acted as a retarder of vulcanization.

Included in the test data presented was information on the increase in resilience with stress, and the reduction of heat build-up with stress for a Neoprene Type W compound containing 20 volumes of SRF carbon black in which the 2 MI acceleration was varied from 0 to one part on 100 of polymer. A comparison of compression set values between a Type W-2 MBT compound, a natural rubber compound, and a Type W-2 MI compound over a range of temperatures from 70 to 120° F. showed the lowest values for the Type W-2 MI compound both at 0 and at 120° F.

T. L. Davies, in his paper, "The Development of Some New Special-Purpose Rubbers," showed some of the improved abrasion and flex data for GR-S type of rubber polymerized at 0° C. Reported also was a new nitrile type rubber polymerized at low temperature which showed the same relative improvement in physical properties of the vulcanizate as the GR-S low temperature polymer. This rubber, called Polysar Krynac, showed improved extrusion and aging properties over a similar nitrile type rubber polymerized at normal temperatures.

The need of a synthetic rubber with a freeze point as low as —100° F. is particularly important in Canada, and results for a new rubber designated as XPRD-70 having a freeze point ranging between —95 and —100° F. were given.

Latex masterbatched synthetic rubber stocks for nuclear sole compounds made from Polymer Corp. rubbers were also discussed, and in conclusion the direction of the so-called "short term" research of Polymer Corp. was outlined. Work on Butyl type rubbers for high-voltage applications and for tire curing bags, oil resistant rubbers with better low temperature flexing characteristics, more versatile GR-S-type low temperature polymers, and stable, high solids synthetic latices were indicated as having priority in future research and development programs.

In the paper, "Effect of Mechanical Aggregation on the Dispersion Characteristics of Carbon Blacks," by E. M. Dannenberg and C. A. Stokes, Godfrey L. Cabot, Inc., the increase in the bulk densities of carbon blacks from the fluffy to the pelletized blacks was mentioned as a source of secondary forces holding the particles together and in some cases making their dispersion somewhat more difficult. The primary forces were attributed to aggregation in the flame in the manufacturing process of the blacks.

Although the effects of high bulk density of carbon blacks in connection with their dispersion in natural and synthetic rubbers are generally not great, increases in electrical resistance and rebound can be observed which may be attributed to poorer dispersion of high density black as compared with low density blacks under similar mixing conditions. This difference can be eliminated by the use of plasticizers that aid carbon black dispersion, and with HAF-type black in natural rubber no effect between high and low density blacks was noted. In nitrile type rubbers poorer dispersion is experienced with highly densified blacks. Carbon black does not disperse so readily in polyethylene as in most rubbers, and a high density black may cause more difficulty than a low density black in this polymer.

The paper, "Low Temperature Rubber," was a joint effort of I. J. Sjothun and J. L. Dum, Firestone Tire & Rubber Co., Akron, O. The authors said that GR-S polymerized at 41° F., or "cold rubber," is now being used extensively in tire treads and retreading materials to provide better wear. From 15 to 35% better tread wear is being obtained with "cold rubber" as compared with regular GR-S and this wear is equal or slightly better than that obtained with natural rubber.

Traction of "cold rubber" treads on ice and snow is about the same as for treads made with regular GR-S, and both are inferior to natural rubber treads in this respect. Traction on wet pavements, how-

ever, with "cold rubber" treads is better than with natural rubber treads. The so-called "high speed separation" of "cold rubber" tires was said to be midway between natural rubber and GR-S.

In factory processing, the "cold rubber" is harder to plasticize than GR-S; it has no better building tack; tread extrusion and shrinkage are better, but variability in mill room control is greater. It was revealed that "cold rubber," as produced, is not so uniform as regular GR-S. Modulus variability standard deviation for GR-S was reported as 35.7, compared with 65.8 for "cold rubber." Natural rubber under the same conditions, however, had a standard deviation of 135.6. It was also revealed that the Mooney viscosity specifications for "cold rubber," as produced, permitted a variation of ± 7 units; while for regular GR-S for treads, limits are ± 4 units.

Aging of both GR-S and "cold rubber" are better than of natural rubber; the brittle point of "cold rubber" is about the same as for natural rubber, and internal friction of "cold rubber" is between GR-S and natural rubber, it was said.

"The Measurement of Strains in Tires," by D. L. Loughborough, J. M. Davies, and G. E. Monfore, B. F. Goodrich Co., Akron, was explained as an experimental approach to the analysis of the development of stresses in tires under load, an analysis which the authors said was almost impossible of mathematical solution.

Tires were loaded, and compression of cord one inch, and two and four inches from rim was measured. Included in this work was data on the effect of varying rim widths on cord compression. The effect of inflation pressures was measured by an X-ray photographic technique on tires built with 10 mil wire in the plies, from which observation of the effect of the varying strain could be followed. It was emphasized that none of the work was done under shock loading.

"Butadiene-Styrene Resinous Copolymers," by J. D. D'Ianni, L. D. Hess, and W. C. Mast, Goodyear Tire & Rubber Co., Akron, reviewed the work done on these-type copolymers, with special reference to the variation in physical properties with variation in the composition of the copolymers and the way in which these physical properties made these materials suitable for rubber reinforcement, the production of impact-resin blends, and solution and latex applications. Data on the use of the copolymers in shoe soles, for impact-resin blends, and in the form of latices in paints of the water-vehicle type were presented.

John McGavack, United States Rubber Co., New York, N. Y., in his paper, "Post-war Review of USF Rubber," showed by means of flow diagram and moving pictures the process for the production of this special type of natural rubber which was developed before the late war and is now being produced in increasing amounts on the U. S. Rubber plantations in the Far East.

Resistance to tread cracking of USF rubber was reported as 40% better than with ordinary rubber, and this special rubber was stated to be cleaner, softer, and more uniform in character than smoked sheet. Although the Mooney viscosity of USF rubber increases with storage in the same manner as smoked sheet, this hardening could be reduced to a minimum, it was reported. The more rapid breakdown of USF rubber, as compared with smoked sheet when the plasticization was accelerated by chemical agents such as Pepton, was also reported.

Although costing more than ordinary rubber, its light color and exceptional cleanliness make USF rubber highly advantageous for use in certain special products, including white sidewalls, transparent tubing, special bottle stoppers, etc.

Groups Hold Outings

DESPITE unfavorable weather, about 135 members and guests of the New York Rubber Group attended the annual outing at Doerr's Grove in Millburn, N. J., on June 15. Between showers, a considerable number of those present participated in the horseshoe pitching, boccie, golf driving, and dart throwing contests arranged by the committee headed by P. Murawski, E. I. du Pont de Nemours & Co., Inc., aided by C. T. Jansen, *Rubber Age*. Others confined their activities to card playing, and all were able to enjoy as much beer and as many sandwiches as they cared for during the afternoon.

The usual softball game could not be played, but winners of the other contests suitably rewarded during the dinner in the evening were as follows: horseshoes, W. E. Lamela, Okonite Co. and Bert Wilkes, Herron Bros. & Meyer; boccie, M. E. Lerner and Mr. Jansen, both of *Rubber Age;* darts, Mr. Lamela and R. M. Thomas; and golf driving, W. J. Sparks, Standard Oil Development Co. Additional prizes were distributed by lot.

The outing was concluded with a chicken dinner, which was one event in which there was almost universal participation. As an extra added attraction the members and guests were entertained by a quartet composed of R. Gimmler, Flintkote Co.; E. Heckmann, Raw Materials Co.; and Messrs. Wilkes and Lerner. The accompanist was Murray Gawl of Lucerne Rubber Co.

Ontario Group Enjoys Day of Golf

The Ontario Rubber Section, C.I.C., held its annual field day on June 10 at Rouge Hills Golf Course, Toronto, Ont., Canada. Approximately 80 members and guests attended the event, which included an afternoon of golf followed by dinner. S. M. Murray, Charles Tennant & Co., chairman of the committee in charge of arrangements, was assisted by F. R. Gorrie, Delacour-Gorrie, Ltd.; R. Ruebottom, W. C. Hardesty & Co.; E. Kent, Canada Wire & Cable Co., Ltd.; A. Barraclough, Canadian Triangle Wire & Cable Co., Ltd.; and L. V. Lomas, St. Lawrence Chemical Co. The distribution of 16 prizes to winning golfers followed the dinner, and there was also a drawing for 20 door prizes contributed by rubber and supplier companies.

Large Crowd Enjoys Akron Affair

The annual summer outing of the Akron Rubber Group, held at the Firestone Country Club on June 16, attracted an attendance of 560 members. The program included a golf tournament in the morning, an afternoon of softball, volley ball, horseshoe pitching, and plug casting, followed by dinner and distribution of prizes.

Low gross honors in the golf tournament were won by John Cseh, Firestone Tire & Rubber Co. Other golf prizes went to R. A. Emmett, Binney & Smith Co.; Frank Behra; R. T. LaPorte, Seiberling Rubber Co.; G. H. Twickler; J. Platner; C. W. Stalker; E. E. McMannis; F. D. Abbott; E. R. Byers; Fred Lockhart; Alex Peresta; L. T. Unks; K. W. Cunningham; W. L. Gibson, Phillips Petroleum Co.; A. S. Krivitsky; T. T. Thompson, Seiberling Latex Products Co.; and A. D. Ames. A special prize, a golfer's prayer rug, was awarded to Harold George, Standard Products Co.

Membership Committee Chairman L. M. Baker, General Tire & Rubber Co., announced during the dinner that the Group now has a paid membership of 1,045, making it the largest in the country. Door prizes were distributed after dinner by means of a new and efficient system employing membership card numbers. C. F. Wimmer, Phillips Petroleum, was general chairman of the outing; William Whittaker, Herron Bros. & Meyer, Inc., was chairman of the prize committee; H. M. Brubaker, Sid Richardson Carbon Co., was chairman of the golf committee; and L. V. Cooper, Firestone, was in charge of arrangements for location and food.

Rain Mars SORG Day

The Southern Ohio Rubber Group held its annual summer outing on June 3 at McCrabb's Grove, Dayton, O. A continuing rain forced the cancellation of all outdoor activities during the afternoon although the morning golf tournament, held at the Eaton Country Club, Eaton, attracted 28 enthusiasts despite the downpour. The golf play included a blind bogie and poker tournament and a distance putting contest. Some 18 prizes were awarded to winning golfers, with first prize in the blind bogie tournament going to W. Bolin, American Zinc Sales Co. Robert B. Sucher, Marbon Corp., took first prize in the poker tournament, and first place in the putting contest was won by William Somers, Inland Mfg. Division, General Motors Corp. The outing concluded with a buffet dinner and the distribution of 31 door prizes made possible by contributions from 19 rubber and supplier companies.

New Latex Accelerator—Merac

MERAC, a new liquid accelerator for use in latex formulations, has been announced by Sharples Chemicals, Inc., 123 S. Broad St., Philadelphia 9, Pa. The new product can be employed in natural and synthetic latices and gives excellent results in natural or GR-S latices cured over a range extending from room temperature to practical latex curing temperatures. Films vulcanized with Merac are characterized by high modulus and tensile strength with flat curing, and excellent aging properties.

Since Merac is miscible with water, it can be added directly to the latex. When diluted, Merac has a low viscosity which affords easy and rapid addition to the latex to give a uniform formulation with a minimum of mixing. The order of addition of Merac to the latex is not critical, provided it is not added with the zinc oxide dispersion. The accelerater may be added either alone or with the other latex compounding ingredients, as long as it is not combined with the zinc oxide prior to addition to the latex.

Natural latex formulations accelerated with Merac have good stability and show a minimum change in viscosity on storage. Merac is deep red to brown in color and has a characteristic odor. It has a specific gravity of 1.034 and is soluble in alcohol. Samples and further information are available from the manufacturer.

Silicone Rubbers for Low Temperature Use

A RECENT investigation at the National Bureau of Standards, Washington 25, D. C., has shown that the silicone rubbers, developed especially for high temperature uses, have better potentialities for use at extremely low temperatures than any other synthetic or natural rubber studied thus far. This conclusion is based primarily on measurements of the second-order transition temperature of silicone rubbers made by C. E. Weir, W. H. Leser, and L. A. Wood, of the Bureau staff.[1]

Tires, belting, or other articles of ordinary rubber lose their elasticity around −50° C. (−60° F.), presenting many difficulties in connection with the operation of motor vehicles and machinery in the Arctic, or of airplanes at high altitudes. To determine the possibilities of using the silicones for such low temperature applications, the Bureau undertook an investigation to find out the lower limit of the temperature range in which they retain their characteristic elasticity.

This lower limit was determined by finding the second-order transition temperature. In practice, a rubber becomes useless for applications requiring long-range elasticity at temperatures somewhat higher than the transition point; the exact amount of the difference depends on the particular application. Thus, the second-order transition temperature of natural rubber is −70° C., but the rubber is seldom useful below about −55° C.

The silicone rubbers studied were all of commercial origin; two were pure gum stocks, and the balance contained fillers and vulcanizing agents. As only small differences in transition temperature were observed among any of these samples, it was concluded that fillers and vulcanizing agents have little effect on the second-order transition temperature. All of the silicone rubbers exhibited a second-order transition at approximately −123° C., the lowest temperature at which such a transition has been observed in a polymeric material.

Most of the silicone rubbers also went through a first-order transition at temperatures ranging from −65 to −75° C., with consequent stiffening owing to crystallization. One variety, however, exhibited no first-order transition and should have good possibilities for use at temperatures as low as −100° C.

[1] "Crystallization and Second-Order Transitions in Silicone Rubbers." *J. Research NBS*, 44,367 (1950), RP2084.

Halocarbon Polymers Available

THE quantity production of stabilized low polymers of chlorotrifluoroethylene, called Halocarbons, in the form of oils, greases, and waxes has been announced by Halocarbon Products Corp., North Bergen, N. J. These polymers are completely inert toward all corrosive agents, including acids, alkalies, salts, and oxidizing agents and are not affected by prolonged heating in air at 480° F., it is claimed.

Of interest to plastics fabricators is the use of liquid and solid Halocarbons as softeners for chlorofluorocarbon plastics in molding and coating operations. The addition of Halocarbons yields a molding mix that can be readily melted and formed without the decomposition which is usually experienced in fabricating the pure plastic.

No. California Group Plans

THE Northern California Rubber Group met on May 25 at the Claremont Hotel, Berkeley. Speaker of the evening was Ross E. Morris, Rubber Laboratory, Mare Island Naval Shipyards, who presented a paper on "Low Temperature Rubber Gaskets," stressing the importance of crystallization and second-order transition points in determining the suitability of rubber for low temperature service.

Following its next regular meeting on June 29, the Group will hold its annual outing on August 6 at Tilden Regional Park, Berkeley, and resume regular monthly meetings on September 29. The annual Christmas party will be held on December 11 at the Willows, Orinda.

CALENDAR

May 30- Sept. 9.		World Transportation Fair. Santa Anita Park, Los Angeles, Calif.
July	28.	Chicago Rubber Group. Annual Golf Outing. Medinah County Club, Itasca, Ill.
Aug.	4.	Chicago Section, SPE, and Midwest Chapter, SPI. Golf Outing. Skycrest Country Club, Libertyville, Ill.
Aug.	6.	Northern California Rubber Group. Annual Outing. Tilden Regional Park.
Aug.	7-19.	U. S. International Trade Fair. Chicago, Ill.
Aug.	8.	New York Rubber Group. Golf Tournament, Baltusval Club Springfield, N. J.
Aug.	25.	Philadelphia Rubber Group. Summer Outing. Cedarbrook Country Club, Wyncote, Pa.
Sept.	3-8.	American Chemical Society. Chicago, Ill.
Sept.	5-9.	Chicago Section, A. C. S. Sixth National Chemical Exposition. Chicago Coliseum, Chicago, Ill.
Sept.	13.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Sept.	18.	Rochester Section, SPE. Redmen's Club, Rochester, N. Y.
Sept.	20.	New York Section, SPE. Hotel Shelburne, New York, N. Y.
Sept.	22.	Chicago Section, SPE, and Midwest Chapter, SPI. Golf Outing. Skycrest Country Club, Libertyville, Ill.
Sept.	26-29.	Industrial Packaging & Materials Handling Exposition, Philadelphia, Pa.
Sept.	28-30.	American Association of Textile Chemists & Colorists. The Wentworth, Portsmouth, N. H.
Sept.	29.	Northern California Rubber Group, Claremont Hotel, Berkeley, Calif.
Oct.	2.	Philadelphia Section, SPE.
Oct.	3.	The Los Angeles Rubber Group, Inc., Hotel Mayfair, Los Angeles, Calif.
Oct.	6.	Detroit Rubber & Plastics Group. Fall Meeting.
Oct.	9.	Upper Midwest Section, SPE.
Oct.	11.	Chicago Chapter, SPE, and Midwest Chapter, SPI. Builder's Club, Chicago, Ill. Newark Section, SPE. Military Park Hotel, Newark, N. J.
Oct.	11-13.	Division of Rubber Chemistry, A. C. S. Hotel Cleveland, Cleveland, O.

Diox 7—Polymerization Accelerator from Phillips Petroleum

DIOX 7, tertiary-butylisopropylbenzene hydroperoxide in a 50% solution with the parent hydrocarbon solvent material, is now available in semi-commercial quantities from Phillips Petroleum Co., Bartlesville, Okla. The new chemical has been effectively utilized as an oxidant or "initiator" to promote rapid emulsion polymerization of butadiene and styrene with redox and peroximine recipes, such as those employing ferrous pyrophosphate and polyamines. Diox 7 is said to be more active than other commercially available hydroperoxides used in low temperature polymerization of rubber; consequently less is required to initiate polymerization. Bulk polymerization of vinyl-type monomers is also accelerated by Diox 7.

Tertiary-butylisopropylbenzene hydroperoxide in the pure state is a white crystalline compound. The 50% solution being marketed is a semi-solid at room temperature, but completely liquid above 110° F. It has high relative stability for a hydroperoxide and satisfactory solubility in certain organic solvents. Both the hydroperoxide and solvent have low volatility, and the solution has a flash point of about 300° F.

New OTS Bibliography

A NEW technical bibliography, "The Technology of Fungi, Mold and Mildew," compiled by the technical library of the Philadelphia Quartermaster Laboratories, has been released by the Office of Technical Services, United States Department of Commerce. The bibliography is a 161-page collection of selected technical references relating to microbiological infection and tropical deterioration of industrial and military materials, with special emphasis on studies published since 1927. The report is divided into three parts: Part I gives more than 1,400 references from periodicals arranged alphabetically by authors; Part II lists some 40 books on the subject; and Part III covers some 80 patents, with brief abstracts given for certain patents. Orders for the report, PB-100356, priced at $1, should be addressed to OTS, Washington 25, D. C., accompanied by check or money order payable to the Treasurer of the United States.

Swedish Rubber Federation

THE Swedish Federation of Rubber Technologists was established in Norrkoping by some 60 representatives of the Swedish rubber industry. According to the by-laws adopted by the group, the Federation will promote the progress of rubber technology in Sweden and other Scandinavian countries and cooperate with other rubber industry scientific and industrial organizations in foreign countries.

The following officers were elected for 1950: chairman, Frank Holmes, Goodyear Sweden; vice chairman, Bo Sarno, Liljeholmens Cable Works; secretary, Erik Jonson, Rubber & Plastics Co.; and treasurer, Christer Nordenskjold, Overman Rubber Co. In addition to the officers, other directors of the Federation are: Olle Carlson, Viskafors Rubber Co.; Lennart

(*Continued on page* 458)

RUBBER WORLD
NEWS of the MONTH

Rubber Act of 1948 Extended for Two Years; Industry Boom Continues with 109,237 Tons May Rubber Use

Final action on new rubber legislation amounted to a "freezing of the status quo" when the Rubber Act of 1948 was extended until July 1, 1952. Senate rubber legislator Lyndon Johnson in his recommendations, however, asked for another disposal plan report from the Administration by April, 1951, and a "continuing study" of the rubber problem by Congressional committees. Senator Bricker, of the Banking and Currency Committee, in a minority report asked for immediate leasing and rapid reduction of mandatory consumption, both possible under the Act, of which he was the original author in 1948.

The price of natural rubber dropped from 34 to 28¢ a pound after the "highly unusual" statement of the State Department on June 9 calling attention to the 100% rise in the price of natural rubber in the last year and the possible bad effect on the natural rubber producing areas of a continuation of such high prices. The Malayan Government refuted the rumor that natural rubber was being withheld in that country.

Difficulties in allocating scarce synthetic rubber was the cause of considerable activity in the Congressional and executive branches of the government in June. Priority for firms working on military contracts was agreed upon.

Rubber Reserve increased Butyl production by 1,000 tons a month, reduced GR-S styrene content from 30 to 25%, and by operating copolymer plants 24 hours a day and seven days a week achieved a 34,000-ton production of GR-S in June.

Meanwhile the industry boom continued unabated, with May consumption of new rubber reaching a record high of 109,237 tons. Prices of natural rubber inner tubes, molded goods, and foam sponge were increased.

A reduction in excise taxes on tires and tubes was finally written into the new tax bill, but whether or not the new bill will become law is not yet known.

More companies, General Tire, Republic Rubber, and American Dunlop, signed contracts with the URWA for new pension and insurance agreements. The URWA's international policy committee met in Washington during the latter part of June to consider a fifth round of wage increases in 1950 for rubber industry workers.

Washington Report on Rubber Law

Our Washington correspondent, Arthur J. Kraft, in reviewing action on rubber legislation during June states that the Senate Armed Services subcommittee on rubber, headed by Lyndon Johnson of Texas, held two days of hearings on rubber legislation, beginning June 5. It heard the Administration ask for plant disposal authority; Undersecretary of Commerce Thomas C. Blaisdell testified. Then the committee heard virtually the same panel of industry and trade representatives which testified before the Vinson committee in February. The following week the full committee unanimously reported a two-year extension of P. L. 469. The Senate approved this by unanimous consent on June 16. Carl Vinson, three days later, agreed to the Senate amendment substituting a two-year for a three-year extension voted by the House on May 16, sending the bill to the President for signature.

The Senate Armed Services Committee delayed filing its report for a few days in order to give the Banking and Currency Committee an opportunity to review it before it went to the Senate. Banking reviewed it, said it concurred with the recommendation that the law be extended two years, but did not agree with much else. The Armed Services Committee stuck by its report, filing it on June 12. Banking wrote its own report, filed (in mimeograph form) on June 16, minutes before the Senate approved the extension. There was no debate on the bill.

President Truman signed the bill, H. R. 7579, on June 24. It goes into effect July 1 for two years.

Congress, in extending Public Law 469, surprised no one and perpetuated a rubber policy that almost all rubber men feel could and should have been changed.

The Congressional Armed Services Committees, into whose hands went the decision, were concerned almost solely with framing policy and a program that would be safe national securitywise. They were cautious.

Both Vinson and Johnson argued from the premise that The Rubber Act of 1948 has done the job and that changes should be made only if paramount reason could be advanced that changes would do it better.

The rubber industry, as a group, could not produce the assurance that its proposed changes — never unanimously endorsed—would bring the certitude that a busy Congress was seeking in this period of "cold war" stress. The industry, by and large, wanted a disposal program now, but when the chips were down, they could endorse—and again not unanimously—only a lease program repugnant to the Administration.

The Administration, too, became increasingly bold in its endorsement of a disposal program, finally soft-pedaling its other demands and, as diplomatically as it could, scuttling the one demand that angered Congress most—a 10-year law leaving policy strictly in the hands of the President.

Nevertheless the Administration had to concede it has strong reservations. It would sell plans to industry, but on terms repugnant to the industry.

The burden of proof was placed squarely on the shoulders of those who wanted change. Since they failed to satisfy Congress, much less each other, that they had something better, Congress took the easiest and safest course and extended a law which it has come to regard as "our greatest insurance policy."

The "freezing of the status quo" was complained of much; the two-year extension left rubber men with the feeling that we were passing up a chance for progress.

Congress, in extending the present act, expressed the belief that progress could be made under it. But it left unresolved just how the Administration and the industry were to make the progress.

Both Vinson and Johnson endorsed a law which authorizes the Administration to sell or lease plants and reduce controls and encourage product research. But Vinson declared he wants no lease, no sales. Johnson said the Administration should investigate the "possibility" of making leases on its own terms and hoped a lease could be made.

Both shied away from the strong report —which carries no official sanction as a Congressional directive—filed by Sen. John Bricker calling for leases now and a rapid reduction in controls. Johnson made short shift of Bricker's bill directing compulsory lease.

This action was taken, despite Bricker's warning—in essence that of the Steelman report, and backed most strongly in the military agencies—that progress could be made only if industry had the freedom and incentive of competition for profit that lease or ownership of facilities could bring.

Congress was aware of this irresoluteness. Johnson said he hoped that in another two years the "cold war" will have firmed up, one way or the other, enough so Congress could frame more definitive policy, preferably a step toward getting the rubber plants in the hands of private industry.

Congress did take one affirmative step. Both Vinson and Johnson officially urged the Commerce Department to speed up its reduction of specification controls to provide a wider area for voluntary consumption of GR-S. In their eagerness, however, to keep the program "flexible" until Congress can again review it two years hence, they refused industry proposals spelling out systematic reductions.

Since the directive to reduce controls in view of the favorable statistical prospect for high and firm GR-S use was to the Commerce Department's rubber division, it is worth noting the argument, made in the May, 1950, bimonthly industry report edited by Assistant Director Everett G. Holt that: (1) reductions in mandatory consumption of synthetic made in the last year (85,000 tons less) "represent long steps in the desired direction" of terminating controls as soon as possible consistent with national security; and, (2) the ways the regulations are set up "afford the widest scope for competitive use of the required material."

Johnson also joined Vinson in refusing to recommend that the Administration stockpile synthetic rubber. He also passed over an industry recommendation that a substantial working inventory of synthetic rubber be built up by the government through continued capacity production, including that of a reactivated plant. He explained that the shorage of feedstocks makes this impossible to achieve at this time. Moreover he apparently accepted the RFC's view that present production is satisfying requirements and there is no

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need of spending money on additional production for a big inventory.

What left many puzzled was why Johnson and Vinson failed to make an exception for Butyl; but both refused to recommend sale or lease of a Butyl plant. Esso Standard Oil said it would buy a Butyl plant, if given the opportunity, and would put millions of dollars into promoting wider use of this rubber. The Administration, too, argued that Butyl certainly should now be treated like neoprene; that it could hold its own without risk of encroachment by cheap natural rubber.

The conflicting mandates on leasing will probably be straightened out by consultation among the military agencies with the House Armed Services Committees.

Bricker's "supplementary report," taking a strong stand on leasing, is "no more than an expression of opinion by Bricker and his crowd," Johnson said. It carries no weight as a mandate.

The Bricker report, filed by the Banking and Currency Committee which had jurisdiction over rubber legislation two years ago, did attempt to clear up a question troubling RFC attorneys.

Under the law, production from a leased plant cannot be used to satisfy mandatory usage. The question is what is to be considered mandatory usage—the 200,000 tons' national security minimum of GR-S which must be consumed, or the quantity required to be used by changing specification controls aimed at assuring that minimum consumption?

Bricker said that when Banking wrote P. L. 469 two years ago, it meant the latter, and therefore only the 160,000 tons' specified usage under R-1 as it stands today cannot be filled by production of a GR-S plant leased by a private company.

Bricker said that he thinks this interpretation should be accepted by RFC since it was Bricker who wrote the law. In his report Bricker also urged that specification usage be "substantially reduced," leaving a greater area of consumption which could be filled by private production.

Johnson, recommending a "continuing study" of the rubber problem by Congress and another report on disposal by the Administration next April, couched his thoughts on leasing in these words:

"There is reason to believe the progress toward the objective of a free, competitive synthetic rubber industry can be made under the present law. There is ample authority in Section 7 of the Rubber Act of 1948 to lease the Government-owned facilities to private industry.

"Short-term negotiated leases are not subject to the same objections from a security standpoint as disposal by sale, particularly in view of the lease restrictions required by section 7 of the Act. The Committee believes that the responsible agency of the Government should fully explore the possibilities and determine the advantages to accrue from short-term lease or leases for one or more of the synthetic rubber plants now owned by the Government to see whether leases can be negotiated to the benefit of all concerned."

This, Johnson agreed, is a loose directive, if one at all, and deliberately so. It does not tie the RFC's hands. The language was drafted in consultation with RFC officials. Johnson also urged the Administration to lease at least one plant to a small operator, or group of operators, if it makes any leases.

When seeking the full Armed Services Committee's approval of his bill and recommendations, Johnson dismissed the Administration's disposal program as "unrealistic and probably unworkable" and said Bricker's compulsory leasing proposal "would precipitate an interval of disruption and confusion in the synthetic rubber program at this critical moment. If we cannot justify relaxation of Government production and use controls—and the Bricker bill recognizes that such controls cannot be relaxed now—then we can hardly justify relaxing government ownership of synthetic facilities."

He called compulsory leasing a "straitjacket on the government's ability to bargain."

On the disposal issue, it might be noted that the interagency committee which spent five months in almost daily consultation before drafting the Steelman report struggled with this problem of leasing.

For a long time the administration group was divided into two schools of thought. One argued that as long as controls are required, there should be no disposal. The other, whose views finally emerged as the Administration's disposal recommendations to Congress, backed a "peel-off" approach to plant disposal. Since controls are needed, and private ownership is desirable, they said in effect, let us sell one plant at a time. If the program runs into trouble, then we can stop short and sell no more. Congress decided the latter plan was too risky.

Rubber Demand, Supply, and Price

World production of natural rubber in April was estimated at 140,000 tons, exceeding consumption the same month by 10,000 tons, the U. S. Department of Commerce reported on June 5. April output brings the total for the first four months of 1950 to 507,500 tons, up 37,500 tons from the figure for the same period last year.

Exports from Indonesia during April, at 60,049 tons, set a postwar record. The Indonesian total included 17,366 tons of estate rubber and 42,683 tons from native sources. It was estimated that about 25,000 tons of estate rubber, accumulated since the first of the year, remain in Indonesia.

Total new rubber consumption, including 130,000 tons of natural and 40,000 tons of synthetics, was placed at 170,000 tons for April and 670,000 tons (517,000 tons natural) for the first four months, up 12,500 tons over the same months in 1949.

Imports of natural rubber into Russia during the first four months of 1950, included above as consumption, amounted to only 11,000 tons, compared with 47,500 tons in the same period of 1949. Estimated foreign consumption outside Russia increased about 18,000 tons in the four months, compared with 1949 figures.

World stocks of natural rubber, excluding Russian stocks and government stocks in this country, the United Kingdom, and France, are estimated at 692,500 tons at the end of April, compared with 715,000 tons at the end of 1949. Stocks in consuming countries on April 30 were 265,000 tons, unchanged from January 1. World stocks of synthetic rubber at the end of April stood at 95,000 tons, a reduction of 15,000 tons since January 1.

Rubber production in British Malaya during April amounted to 49,076 long tons, as compared with 45,882 tons in April, 1949, the Commerce Department stated on June 6.

During the first quarter of 1950, production in Malaya was 6.9% below that of the same period in 1949, but increased April output reduced this lag to 4.2% for the four-month period. The decrease in the first quarter of this year was not considered significant, the Rubber Division of the Office of Domestic Commerce said, as it resulted partly from excessive rains and partly from the natural ending of heavy yields after continued tapping since 1946. There is little evidence that domestic disturbances contributed to the drop.

Shipments from up-country Malaya in April came to 48,924 tons, a sharp reduction from March when, with clearance of stocks, shipments reached 68,604 tons. Total exports, including reexports, have not yet been reported, it was said.

The high price of natural rubber which has prevailed during recent months was viewed with apprehension by many members of the Malayan rubber industry, the American Consulate General at Singapore reported. With the price of natural rubber at the end of April 6½ U. S. cents above the price of GR-S, local interests feared that arguments for deliberate use of increased synthetic production to check natural rubber price would be reinforced. [The price of No. 1 sheet rubber rose to 34 U. S. cents a pound in early June, and synthetic production is being stepped up. *EDITOR.] The Consulate reported that the consensus of opinion in Malaya seemed to be that the sooner the speculative "squeeze" was over and prices reverted to reasonable levels, the better.

Interests in Malaya do not look for a rapid decline in natural rubber prices in the immediate future, unless one or more of the following actions is taken:

(1) The United States announces shortly a sizable increase in synthetic production.

(2) An early clarification of Indonesian policy on currency devaluation facilitates clearance of accumulated stocks and permits exports on a normal basis.

(3) The London Board of Trade decides to dispose of a substantial tonnage of rubber purchased in Malaya in 1946, which now could be sold at a profit.

As indicated above, increased GR-S production has been promised by the Office of Rubber Reserve. Then on June 9 the U. S. State Department in what has been termed a "highly unusual statement" warned that the 100% rise in natural rubber prices since last year "is such as to create anxiety as to the future well-being of the natural rubber producing areas. It could lead to a decreased demand for natural rubber and to higher prices for rubber products. Tire prices have recently been increased by some manufacturers.

"These countries have been told that the United States believes that wide speculative swings in the price of a major raw material perform a disservice to producer and consumer alike," it was added.

"The latest available statistics," said the State Department, "indicate that present prices may reflect a temporary scarcity of spot rubber due to a number of market factors and that the upward price movement may be arrested by increased marketings of natural rubber. April exports from Indonesia were nearly three times January exports."

It was pointed out that what the American Government is trying to do is to stimulate an even flow of rubber to market in the volume necessary to keep prices at a desirable level.

On June 12, probably because of a combination of factors rather than any one factor, the price of No. 1 sheet rubber

dropped to between 28 and 29¢ a pound in New York and remained at the level into the latter part of June.

No Withholding in Malaya

The *Natural Rubber News* for June published a release, issued in Kuala Lumpur, Malaya, June 3, by the Federation Government, which had as its purpose the denial of some press statements to the effect that producers in that country had been withholding stocks to accentuate the natural rubber price rise. The statement follows:

"The Federation Government has been asked to comment on statements which have appeared recently to the effect that natural rubber is being deliberately held back by producers in this country in order to squeeze the market. The Federation, after making due enquiries, is satisfied that these statements are incorrect for the following reasons:

"(1) Exports from the Federation during the last three months for which complete figures are available (February-April, 1950) are almost identical with export totals for the same three months last year.

"(2) Total stocks held by dealers in ports and on estates have declined steadily from 73,000 tons in January to 60,000 tons in April, 1950. These figures are very much lower than corresponding figures in 1949.

"(3) A very substantial amount of rubber has been sold forward at low prices prevailing early in the present year. The Federation Government has reason to believe that at least 40-50% of the total rubber being produced in the country falls within this category.

"(4) The latest market quotations show little difference between rubber for immediate sale and rubber for delivery several months ahead. This does not support the theory that there is any local manipulation of the market.

"The above facts indicate that the rubber producing industry of Malaya is taking full advantage of the prevailing prices to ship the maximum amount of rubber overseas and are sufficient to refute any suggestion that rubber is being held back in anticipation of a further rise."

Synthetic Rubber Allocation Difficulties

Charges and counter-charges filled interagency mail in Washington in June when it became apparent that small tire and tube manufacturers were having trouble getting enough GR-S and Butyl rubber from ORR to fulfill military contracts.

The situation developed with an appeal for help to Sen. John Sparkman of Alabama, dated June 1, from the Robbins Tire & Rubber Co., Inc., Tuscumbia, Ala. The company's president, Poncet Davis, complained that his 216,000-pound June allocation of Butyl from ORR would not permit him to fill his own 90,000-pound truck tube contract with the Army or supply inner tubes to the Pacific Rubber Co., Oakland, Calif.; so it could meet its commercial competition or fill contracts for tires with the military.

Davis said his company used 215,000 pounds of Butyl rubber a month last year, but took a loss on that production rate. It was using 385,000 pounds this year and was planning to expand production further. Davis asked ORR to raise his June allotment to 370,000 pounds, its original request to the agency.

Senator Sparkman, chairman of the Senate's Select Committee on Small Business, made an effort to get ORR to make more Butyl available to the smaller independent tire and tube manufacturers by setting up a priority for those companies working on government contracts.

West Coast oilman and friend of President Truman, Edwin Pauley, intervened in behalf of Pacific Rubber with a memo to the President. Jess Larson, administrator of the General Services Agency, in charge of government procurement, wrote Harley Hise, chairman of the Reconstruction Finance Corp., suggesting a conference on the matter of synthetic rubber allocation.

Larson was especially bitter in this letter to Hise. With natural rubber prices high, he said, the "Big Four" rubber companies either were refusing to bid on military tire and tube contracts (serving their commercial customers instead) or were submitting bids far out of line with those submitted by the smaller manufacturers.

The so-called "independents," on the other hand, came in with low bids based on the price of synthetic rubber, but found that ORR would not give them enough to satisfy the contracts. Larson said this policy was putting the military tire and tube procurement program in jeopardy.

He took note also that the lack of sufficient synthetic rubber production was slowing up the Munition Board's natural rubber stockpile accumulation, because it helped maintain the high price of that rubber.

Larson added that to force the smaller companies to make deliveries from goods made out of natural rubber at the present high cost would not only be unfair, but, in his opinion, would be adding materially to the monopolistic tendencies that have long existed in the rubber industry.

"It seems to me that it is not only good judgment, but it is the responsibility of the government to use its synthetic rubber productive capacity to force the adjustment of the price of natural rubber in order that the stockpile might be completed at a reasonable cost. I am aware of the increased costs of opening additional plants for the production of synthetic rubber, but I think these increased costs are small in comparison to the increased cost to the stockpile that would accrue if we were forced to go into the market today (about June 3) and buy natural rubber," Larson said.

The Federal Supply Service, under GSA, buys materials for the Munition Board's strategic stockpile.

Pauley put the finger on what he called "one of the most unjust discriminatory things I have seen on the part of a governmental agency" in a letter to Hise. He told Hise, and repeated in his memo to the President, that the "injustice" stemmed from the base period ORR chose on which to allocate its scarce supplies of synthetic rubber—the six months ended March 31, 1950.

In this period, he contended, tire output for new vehicles is at a peak, and the "Big Four" companies have a monopoly on this business. In this period, too, replacement tire sales—in which the smaller manufacturers share—are at their "lowest." The major companies have the financial resources, he said, to build up material inventories to draw on in lush contract season, while the "independents" lack them, Pauley explained.

At a conference on June 20 between RFC, the Munitions Board, GSA, and counsel for the Sparkman Small Business Committee, Gerald Hadlock, director of the ORR, promised to make additional rubber available and hoped it could be done from anticipated increased production and not by cutting back on allocations to other rubber users.

ORR Action on Rubber Supply

The Office of Rubber Reserve took the following steps last month to overcome the shortage of synthetic rubber:

1. Opened an additional "line" at the Baton Rouge Butyl plant, increasing monthly production to 5,500 long tons by July, 1,000 tons a month greater than recent normal production.

2. Reduced the styrene content of GR-S from 30 to 25%, the same as during most of the war period, before butadiene shortages in 1945 forced an increase in the styrene content of GR-S from 25 to 30%.

Together with 24-hour, seven-day work schedules at operating copolymer plants, ORR got June production up to 34,000 tons of GR-S, scheduled 35,000 tons for July and slightly higher than 35,000 tons for August and succeeding months. ORR hoped that June saw the peak of consumer demand about 40,000 tons, for GR-S.

3. Produced about 720 pounds of polybutadiene rubber in June for use by a number of tire manufacturers in an effort to get a quick, further road test of tires made with the styrene-free rubber.

Polybutadiene's successful formulation as a carbon black masterbatch was announced in June by Phillips Petroleum Co. The company's chemical affiliate, Phillips Chemical Co., claims that it has taken polybutadiene tire rubber out of the "promising" class and made it a commercial possibility by finding the proper conditions under which carbon black could be successfully introduced into the latex and also have the proper consistency in the coagulated form to run through the driers without crumbling.

RFC Reorganization

President Truman's Reorganization Plan for transferring the Reconstruction Finance Corp. to the Department of Commerce came in for considerable Congressional criticism and possible rejection as the July 9 deadline for vote neared.

The Plan would give the Secretary of Commerce policy-making authority over all of RFC's varied activities, including the major banking activity and the operation of synthetic rubber plants and the Texas City, Tex., tin smelting refinery.

Congressional opposition focussed on giving the Commerce Department, whose task is to promote business enterprise, power over lending operations which, Congress believes, should be conducted according to sound banking principles.

Also, the President's proposal was called "premature" in view of a current Senate Banking Committee investigation into RFC's lending operations—an investigation intended to determine whether and what large-scale changes should be made in the government banking institution's charter; or whether it should be dissolved and succeeded by something else. The Senate Expenditures Committee on June 21 reported a resolution disapproving the Plan, but without further recommendation.

Unless Congress, by a majority vote of either House or Senate, rejects the Plan, it automatically takes effect on July 9, 60 days after it was submitted to Congress by the President. Plans were reported afoot, in event of a transfer, to remove the

Office of Rubber Reserve from RFC, which would go into Commerce as a corporate entity. Rubber Reserve would be established as a separate corporation — an autonomous Rubber Reserve Corp. in the Commerce Department, free of policy direction by the Secretary of Commerce and his department's rubber division of the Bureau of Foreign and Domestic Commerce.

Industry Boom Continues

Production in almost all branches of the rubber goods manufacturing industry was at near peak levels in June, and the general outlook for the r mainder of the year was very good. A report from Akron in mid-June stated that about 3,500 rubber workers have been recalled to their jobs since January 1. Also, rubber workers have been working more hours a week, particularly those in tire production.

Revised production estimates now place this year's tire production at about 90 million units, or 10 to 15% more than had been expected. Last year the industry turned out 78 million automobile, truck, and farm tires. Tire statisticians are basing their optimistic oulook on reports for the first four months of this year, plus the strong showing made in May and the first two weeks in June, and the sizable order for the third quarter of the year.

At the end of April, The Rubber Manufacturers Association, Inc., reported that tires for passenger cars, trucks, and buses had been produced to the total of 28,415,000 units, up 12.7% over the same period last year. Passenger tire production amounted to 23,957,000 units, an increase of 16% of the same period last year. Truck and bus tire production of 4,458,000 was only 13,000 below the first four months of 1949.

Original equipment tire shipments for the four months reached a new high at 10,771,000 units, an increase of 29% over the 8,307,000 units shipped during the same period of 1949. Manufacturers shipped 11,344,000 replacement tires, a 10% gain over 1949 figures.

In April alone, manufacturers' shipments of passenger tires rose 13.1% to 6,396,173 units, as compared to March shipments. Production amounted to 6,468,984 units, 4.8% more than the March production of 6,172,064 units. Inventories increased 0.21% to 10,353,930 tires on April 30.

Shipments of truck and bus tires declined slightly during April to 1,129,389 units, as compared with 1,140,133 units shipped in March, a drop of 0.9%. Production declined 2.4% to 1,114,443 units, against 1,142,326 in March.

Manufacturers' shipments of automotive inner tubes totaled 6,093,969 units, or 6.3% above March, when 5,733,491 units were shipped. Production was at approximately the same level as in the previous month.

In June most of the tire and tube manufacturers increased the price of natural rubber inner tubes 10%. Goodyear Tire & Rubber Co. announced its increase on June 5, followed by Seiberling Rubber Co., United States Rubber Co., The B. F. Goodrich Co., Firestone Tire & Rubber Co., and General Tire & Rubber Co. The increase will probably become general, but since only about 10 to 15% of all inner tubes are now made with natural rubber, the total effect should not be too great. Higher natural rubber prices which have prevailed during the past several months were the major cause for the increase in tube prices.

In the mechanical goods field production and shipments are similarly considerably higher than six months ago, and the backlog of orders has recently increased owing to price hikes for many items, particularly in the automotive industry. Price increases for foamed rubber products have also finally been required although producers have fought against making such increases because of the effect on the market for this relatively new and much in demand product.

Rubber consumption, as a measure of industry activity, as reported by the RMA on June 26, showed that an all-time monthly high was reached in May with the use of 109,237 long tons, a gain of 14% over April's 95,853 tons. Synthetic rubber consumption totaled 45,300 long tons, up 19% over the 38,037 tons for April; natural rubber consumption was 63,937 long tons, up 10.5% over the April figure of 57,816 tons; and the use of reclaimed rubber, which is not calculated as part of total new rubber consumption, amounted to 24,458 long tons, also up 14% over the 21,463-ton April figure.

A breakdown of synthetic rubber consumption by types gave for May, as compared with April: GR-S, 34,950, against 29,159; neoprene, 3,576, against 3,068; Butyl, 5,675, against 4,765; and nitrile types, 1,099, against 1,045 tons.

Since February the proportion of synthetic rubber use to total new rubber has increased steadily from 36% to nearly 41.5% of the total monthly consumption. Some of the increase in synthetic rubber use was due to the shortage of natural rubber as nearly comparable cost, but experience with its use in certain products demonstrates, the RMA said, that natural rubber may not recapture segments of the market lost to synthetic when supply and costs of the two materials again approach a balance.

Imported Footwear

Congress has decided to put off until next year its full consideration of the Administration's bid to repeal the long-standing "American selling price" method of setting import duties for rubber footwear, certain coal-tar dyes, and a few other products.

The repealer was included in a comprehensive Customs Simplification bill sent to the House Ways and Means Committee by the Treasury Department in late May. Although there was no quarrel with the Administration's contention that the potpourri of law and regulations that now make up the nation's customs system is in dire need of simplification, the postponement was decided upon after vigorous protests to certain proposed modernizations, chiefly the abandonment of special protection afforded by "American selling price" valuations for rubber footwear and coal-tar chemicals.

Both rubber footwear manufacturers and their local unions in the New England area filed protests to repealing "American selling price," using the wholesale price prevailing in the United States as the basis of valuing competitive imported rubber footwear. Ad valorem import duties are imposed as a percentage of the wholesale price. The chief threat cited is Czechoslovakian footwear, produced by "slave labor." The "Iron Curtain" makes it impossible to determine precisely the wholesale cost prevailing for these goods in Czechoslovakia.

Assistant Secretary of State for Economic Affairs, Willard L. Thorp, disclosed before the Senate Labor subcommittee investigating the impact of imports on U. S. employment on June 6 that the heavy initial bond now required to continue importing Czech footwear during the course of a probably protracted Customs investigation has reduced imports of the questionably priced articles to a trickle. Under the Customs procedure the importer's bond is forfeited if investigation shows the "anti-dumping" law is violated.

Thorp has urged dropping the "American selling price" and a return to the "foreign wholesale price" for all imported goods as one point in the Administration's program to removing barriers to increased imports. His promise of increased duties on the few products now treated according to "American selling price" to offset the lesser protection afforded by using the lower "foreign wholesale price" has not satisfied labor or the RMA rubber footwear members. They point out that this policy would constitute no more than a temporary continuance of the present level of protection in view of the Administration's policy of continually lowering U. S. tariffs.

Excise Taxes

The tax-writing House Ways and Means Committee, reversing an earlier "tentative" decision to hold the line on manufacturers' excise taxes for tires and tubes, voted a "permanent" decision June 5 to recommend an immediate reduction of half the increase put into effect in 1941. The decision came as the Committee took a series of two-day votes affirming or reversing previous "tentative" decisions to cut or maintain various manufacturer and retail excise taxes. Total cuts on all items amounted to more than one billion dollars, and this amount is about double that which Treasury Secretary Snyder thought could be made at this time in the excise tax field without cutting too deeply into federal revenues. The Committee also had to face repeated warnings by the President and his Congressional leaders that a sure veto awaited any revenue bill which failed to offset substantially all reductions by increases in other taxes.

The Committee voted to reduce manufacturer excises on inner tubes from 9¢ to 6.75¢ a pound and on tires from 5¢ to 3.75¢ a pound. It also voted a complete exemption to tires for toys, tricycles, lawn mowers, and baby carriages and similar items, now taxed at a 5¢ a pound rate.

The automotive tire and tube excise reduction would cost the Treasury about $50,000,000 a year, the Committee estimated. The RMA had asked that the rates be rolled back to the prewar level of 4.5¢ for tubes and 2.5¢ for tires.

Titus Appointed for NSRB Carbon Black Study

A study of the probable supply and requirements of carbon black in the event of an emergency has been undertaken by the staff of the National Security Resources Board, Chairman W. Stuart Symington announced on May 25.

Harvey Titus, New York chemist and attorney and president of the Carbon Black Export Association, has been appointed a consultant to NSRB's Materials Office to head the study.

The inquiry, first mentioned in our May issue on page 196, will include a survey of present facilities for the manufacture of carbon black and of factors that might increase or reduce the availability of the material.

Mr. Titus is a graduate of Harvard University and the Boston College Law School. From 1930 to 1945 he held a

number of executive positions with Godfrey L. Cabot, Inc., Boston, Mass.

Industrial Relations News

Pension and insurance contracts between the United Rubber Workers of America, CIO, and General Tire, Dunlop Tire & Rubber Co., and Republic Rubber Co., during June were announced.

The General Tire contract includes a five-year, company-financed agreement which provides for retirement at age 65 of employes with 25 years of service at $100 a month, including Federal Social Security benefits. The plan also provides disability pensions for persons with 15 or more years of service and further provides that a worker who is 55 and has 20 or more years of service may obtain early retirement benefits upon consent of the company.

The improved hospitalization program will have the new portions financed by the company; the main body of the plan is on a contributory basis.

Retirement is compulsory at 65 years, if the employe has had 25 years of service, but for the next four years employes who reach 65 years of age and who have less than 25 years' service may continue to work until they reach the 25-year service total. In 1954 retirement at 65 becomes compulsory regardless of length of service.

The Dunlop contract also provides for $100 monthly pensions for workers retiring at age 65 with 25 or more years of service.

Republic Rubber employes may retire when they are 65 years old on $100 a month, and if Federal Social Security benefits, which are included in the pension allowance, increase, the company will increase its pension payment by half the amount of the Social Security increase, it was reported.

The policy committee of the international URWA held a meeting during the latter part of June to consider the matter of further wage increases for union members. The main aim of the meeting, according to the union president, L. S. Buckmaster, was to decide what the wage increase goal will be and how much is to be sought in other benefits in 1950. The executive board of the international union has agreed on the need of new benefits, Buckmaster said, but leaves the program to meet them strictly to the policymakers.

Two labor disputes which have been going on since March in Fremont, O, between the Fremont Rubber and Crown Rubber companies and AFL unions, were settled early in June when a new two-year contract was signed. No pay increases were granted, except for overtime and holiday work. In the Fremont Rubber dispute, a union shop issue was compromised; the local union gave up its union shop demand under an agreement which calls for maintenance of membership, which means that once a worker joins the union, he must maintain membership during the contract's duration.

It was also announced late in June that Midwest Rubber Reclaiming Co. had signed a fully funded, company financed pension, insurance, and welfare program with the URWA. Employes with 25 years' service may retire at 65 years of age with $100 a month pension, including Social Security benefits, as has been the case with most of these recently negotiated contracts. Additional features include a $2,000 life insurance policy paid for by the company; $25 a week benefits for 26 weeks in case of non-occupational illness; hospital benefits of $7 a day for 70 days, plus up to $70 for miscellaneous hospital expense; up to $218 surgical benefits.

Quaker Rubber Corp. signed a new contract with the URWA which in addition to pensions and disability benefits, included an increase in the night shift workers' bonus from 3¢ to 5¢ an hour. The pension agreement is for $100 a month for workers with 25 years' service on their sixty-fifth birthday, and workers who become disabled will receive minimum pensions of $50 a month if they have had 15 years of service.

EAST

G-E Laboratory Being Completed

The new quarters of the G-E research laboratory are nearing completion near Schenectady, N. Y., and will soon be fully occupied, it was announced by C. G. Suits, vice president and director of research for General Electric Co. Construction began in 1946, and the remaining sections of the new facilities are being rushed to completion. Most of the laboratory divisions still located at the main G-E works in downtown Schenectady have begun to move to the new quarters, and the entire laboratory will be completely occupied by late August, Dr. Suits said.

Exclusive of minor service buildings, the laboratory plant totals five buildings with a usable area of about 185,000 square feet. This includes the main five-story building, the radiation laboratory, low temperature laboratory, chemical pilot plant, and shops for machine work, woodworking, welding, glass blowing, etc. Dr. Suits stated that the laboratory incorporates the "universal space" concept of building design which permits the installation of any research facilities as desired. Readily available facilities and the use of movable partitions permit laboratory rooms of any size from six feet wide to the length of the building.

During recent weeks the research library has moved into the new section. Part of the metallurgy division was moved in May, and transfer of the chemistry division is now under way.

Personnel Promoted

Paul F. Preston has been appointed manufacturing manager of the chemical department of General Electric Co. Mr. Preston came to the company early in 1949 as manufacturing manager of the chemicals division of the chemical department and last December was also made engineering manager of that division.

A graduate of Lehigh University in chemical engineering, Mr. Preston has had a wide range of experience. From 1935 to 1938 he was an industrial engineer in the engineering department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. From 1938 to 1940 he was assistant superintendent of the vinyl resin plant of du Pont's plastics department at Arlington, N. J. Then from 1940 to 1943 Mr. Preston was superintendent of the methyl methacrylate plant at the same location. In 1943 he was made superintendent of the development section of the plastics department in Arlington, a position which he held until 1946, when he was made assistant works manager of du Pont's plastics department plant at Parkersburg, W. Va. In 1947 he became assistant to the technical director of the Barrett Division of Allied Chemical & Dye Corp., New York, N. Y.

He is a member of the American Chemical Society and of the American Institute of Chemical Engineers.

In his new capacity Mr. Preston will have staff responsibility for all manufacturing activities within the chemical department, which includes plants in Schenectady and Waterford, N. Y.; Anaheim, Calif.; Pittsfield, Springfield, and Taunton, Mass.; Decatur, Ill.; and Coshocton, O.

William L. Rodich has been named manufacturing manager of the chemicals division of the chemical department. Mr. Rodich, formerly was with S. B. Penick & Co., where he was superintendent of manufacturing. He is a member of the American Chemical Society, the American Institute of Chemical Engineers, the National Society of Professional Engineers, and the Masonic Order.

Quaker Rubber Corp., Philadelphia, Pa., division of H. K. Porter Co., Inc., has announced the retirement on June 1 of Frank L. Jones, secretary and assistant treasurer. Mr. Jones had 48 years of continuous service with the company, having joined Quaker in 1902. A testimonial dinner honoring Mr. Jones was held June 6.

Company President T. M. Evans announced the election of F. A. Rehorst as secretary and V. P. McNichol as assistant treasurer, replacing Mr. Jones. At a meeting of the board of directors in Pittsburgh, Pa., on June 1, General Manager J. R. Keach was elected vice president and director, and General Sales Manager G. C. Johnson was elected a director of the company.

View of G-E Research Laboratory near Schenectady, N. Y., Shows New Section *(at Left)* Nearing Completion

Advanced by Stein, Hall

Stein Hall & Co., Inc., 285 Madison Ave., New York 17, N. Y., last month made Norman Nuttall assistant technical director of the company and Leonard F. Costello manager of the textile department of the sales division.

Mr. Nuttall started in the dyestuff laboratory of Ciba Co. in New York in July, 1938, but transferred to Stein, Hall in March, 1940. Assigned to the Charlotte, N. C., laboratory, he performed technical sales work in the various southern mills. Next came his service in the late war. Mr. Nuttall rejoined Stein, Hall in Charlotte as a technical salesman, but was switched to the technical division in New York in August, 1946. In October, 1948, he went to the paper department as a technical salesman and in March, 1949, became manager of the textile department.

Mr. Costello has been with Stein, Hall since February, 1940, except for four years in the Chemical War Service during the war. First he worked in the company's textile laboratory in Providence, R. I. Returning to mufti in March, 1946, he was sent to the company's home office as assistant to the manager of the textile department. In September, 1948, Mr. Costello was given the task of creating and building Stein, Hall's latex products department.

Donald V. Brandon recently resigned as vice president of the company and manager of the rubber department.

NAWMD's Rubber Committee

Henry E. Rose, H. Muehlstein & Co., Inc., Akron, O., president of the Scrap Rubber Institute of the National Association of Waste Material Dealers, Inc., Times Bldg., New York 18, N. Y., has announced the appointment of the group's executive committee, as follows: John J. Costello, Tanney-Costello, Akron; Tom Crosby, Muehlstein, Boston, Mass.; Louis Fishman, Louis Fishman & Co., Inc., Chicago, Ill.; Ben Gordon, A. Schulman, Inc., Akron; and A. Lowenstein, A. Lowenstein, Newark, N. J.

Roger Ottignon, Nat E. Berzen, Inc., New York, N. Y. is vice president of the group.

Mr. Costello has been named to the membership admittance committee of the NAWMD, representing the Scrap Rubber Institute.

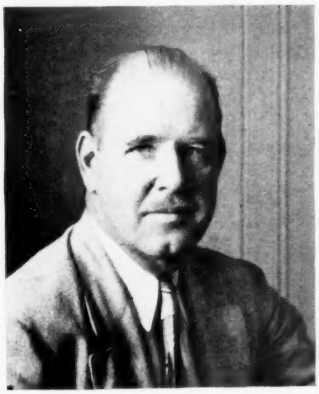
Chester H. Peterson

The DeVilbiss Co., Toledo, O., manufacturer of air compressor outfits and spray painting equipment, will soon establish a modern manufacturing plant in Somerset, Pa. The early start of operations in Somerset will greatly improve the company's competitive position, result in closer cooperation with many of its major suppliers, and permit more rapid and economical distribution to its customers, it is said.

Plax Corp., manufacturer of Plaxpak unbreakable and squeezable plastic bottles, has added 20,000 square feet of production space by moving its headquarters sales and accounting offices to 450 Asylum St., Hartford, Conn., and its engineering and research departments to 411 Homestead Ave., Hartford. The company's mailing address remains the same: P. O. Box 1019, Hartford 1, Conn.

U. S. Rubber Reclaiming Co., Inc., Buffalo 5, N. Y., through President Jean H. Nesbit, has announced the election of the following officers: vice president in charge of technical development, John S. Plumb; vice president in charge of production, Chester H. Peterson; vice president in charge of sales, Robert Cowen; sales manager, Charles F. Smith; and treasurer, Henry C. Egerton. Mr. Plumb was previously vice president and factory manager of the company; Mr. Cowen was a sales representative; and Mr. Egerton, comptroller.

John S. Plumb



Robert Cowen

Haley, Fisher Advanced

William J. Haley, coordinator of the refining operations of Standard Oil Co. (New Jersey), has been elected president of Esso Export Corp., Rockefeller Center, New York 20, N. Y. He succeeds Frank M. Balling, who remains a director pending his retirement in the near future.

Because of the growing importance of its activities in supplying petroleum products to world markets, Esso Export also increased its board of directors from eight to nine. Mr. Haley will also serve as the additional director.

Harold W. Fisher, deputy coordinator, succeeds Mr. Haley at Jersey Standard.

The new president of Esso Export joined the Jersey Standard organization 36 years ago after graduation from the University of Pennsylvania as a mechanical engineer. His career includes service in executive capacities at refineries of the Esso Standard Oil Co., at Bayway, N. J., Baton Rouge, La., and Charleston, S. C., and with Latin American affiliates. Appointed coordinator of foreign refining activities in 1944, Mr. Haley became coordinator of Jersey Standard's worldwide refining operations in 1947. He served with the United States Navy in the first World War and during World War II was chairman of the Caribbean Area Petroleum Committee.

Mr. Fisher first entered the Jersey Standard organization in 1927 on his graduation from Massachusetts Institute of Technology with a degree in chemical engineering. Much of his career has been devoted to the development and production of chemicals from petroleum. Before becoming deputy coordinator of refining activities in 1949, he was a director of Esso Standard Oil Co. and manager of the company's East Coast refineries.

Mr. Balling started with the Jersey Standard organization 45 years ago as an office boy. After successive promotions he was elected vice president of the Standard Oil Export Corp., predecessor of Esso Export Corp., in 1929, and in 1944 was elected president of the newly created Esso Export Corp.

Better Finishes & Coatings, Inc., manufacturer of paint, plastic, and chemical products, Newark, N. J., has appointed Kraft Chemical Co., Inc., 917 W. 18th St., Chicago 8, Ill., Midwest Sales representative.

Henry C. Egerton

American Cyanamid's Stamford Laboratories Hold Open House

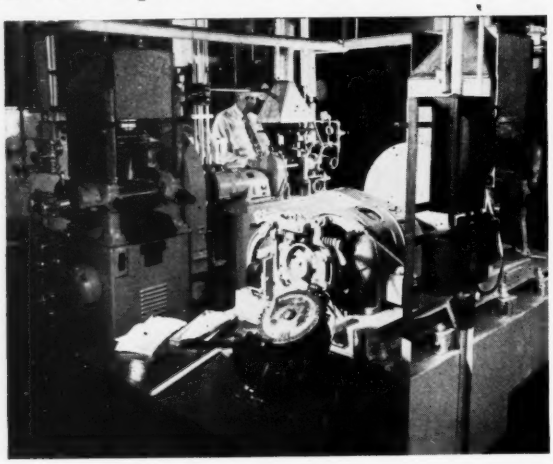


Fig. 1. Rubber Mill Room

Fig. 2. Rubber Chemicals Laboratory

The Stamford research laboratories of the American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. held their first open house for families and friends of employes, specially invited guests, and the press, on May 19, in Stamford, Conn. The laboratories, which were established in 1936, have been expanded until, at the present, laboratory buildings are spread over an area of 40.6 acres. Approximately 800 people are employed, 400 of whom have technical degrees from 275 different colleges and universities. There are 257 chemists, 20 biologists, 27 physicians, 96 engineers, and 14 attorneys on the staff, who have 91 assistants, 63 craftsmen, 27 laboratory helpers, and 166 clerical and other workers to aid them in their work.

E. H. Northey is administrative director of the Stamford research laboratories, which are the central laboratories for the 38 plants and mines that make up the American Cyanamid Co. The various divisions of the laboratories are headed up by J. T. Thurston, research; W. H. Harding, technical service and development; Wm. Engs, chemical engineering and pilot plant; R. P. Chapman, analytical and testing, R. O. Roblin, chemotherapy; L. J. Christmann, basic nitrogen; S. J. Swainson, metallurgical and mineral dressing; W. P. Pennoyer, general laboratory management, plant property and service; Miss L. W. Woodford, technical and plant personnel; and E. J. Culmann, accounting.

The laboratories provide research facilities which contribute to several thousand products sold to 200 industries. Among the products developed at Stamford are melamine resins used in the plastics industry, for wet strength papers, as shrink proofers of fabrics, and for improving leather; acrylonitrile, a basic material for synthetic rubber and important new synthetic fibers; parathion, one of the more powerful of all insecticides; sulfadiazine; and Tagathen, a prescription anti-histamine used for hay fever and asthma.

It would be practically impossible to describe as a result of one short visit the many ramifications of equipment and processes found in these laboratories, but it was not difficult to see how the $5,000,000 a year spent in research and development was required for the operation of American Cyanamid's Stamford research laboratories. The laboratories are completely equipped so as to give all possible aid in the development of new products, in testing and evaluation work, and in adapting the company's products to the specific needs of its customer industries. Separate laboratories, for example, deal with such developments as chemicals for the improvement of paper, including wet strength papers; new chemicals for the flotation process of separating ores; shrink-proofing compounds, and finishing chemicals for the textile industry; compounds for the production of tires and other rubber goods; materials for the heat-treating of metals; agricultural chemicals; pharmaceutical products; and chemicals used by a wide variety of other industries.

Of special interest to readers of India Rubber World should be the accompanying illustrations of the rubber chemicals laboratory and the rubber mill room.

Powers Elected Vice President

American Cyanamid has elected E. D. Powers a vice president. Formerly production manager of the company, Mr. Powers will now be in general charge of all matters concerning plant operations, including related activities of staff departments. Mr. Powers, with the company since 1918, has served in many capacities with several divisions. From 1923 to 1940 he was plant engineer at Niagara Falls, Ont., Canada, and during this period spent two years in South Africa supervising the construction of a cyanide plant. From 1940 to 1946 he was plant manager of the company's Welland, Ont., plant.

A. J. Weight, Jr., and J. F. Allen have been appointed technical service representatives of the company's synthetic organic chemicals department. Dr. Weight joined Cyanamid in 1947 and worked in the Stamford laboratories on new products, surface active solutions, and general physical chemistry problems. Mr. Allen was employed by Devoe & Raynolds Co., Inc., during the past four years.

Other Personnel Promoted

American Cyanamid later appointed Elmore H. Northey assistant to Robert C. Swain, vice president in charge of research and development. The company also announced the appointment of Jack T. Thurston as administrative director of its Stamford research laboratories, and Joseph H. Paden as director of the research division of the laboratories.

Dr. Northey, administrative director of the laboratories since 1945, joined the Calco Chemical Division of American Cyanamid in 1932 and was assistant director of research in charge of research and development on pharmaceuticals, when he was transferred to Stamford in 1945.

Dr. Thurston has been director of the research division of the Stamford laboratories since 1945, where he was first employed in 1937 and has specialized in the development of organic nitrogen compounds. During the war he served as a civilian with the Atomic Energy Commission and the Army and Navy. In 1946 he was loaned to the Department of Commerce and made an extended trip to occupied Germany, where he investigated phases of the chemical industry, including insecticides, organic chemicals, and plastics.

Dr. Paden came to American Cyanamid in 1937, and was assigned to resin research. He has specialized in the development of nitrogen derivatives by high-pressure reactions. In 1945 he was appointed assistant director of the research division of the laboratories.

F. L. Eger has entered the employ of American Cyanamid's industrial chemicals division in the capacity of technical representative on its products for the rubber industry, in which he has had broad experience as a technologist. He will make his headquarters at the Cleveland, O., office, 850 Leader Bldg., of the company's industrial chemicals division.

Kahn Buys Norwalk

Albert M. Kahn, president of Acme Hamilton, Inc., Trenton, N. J., has announced his purchase, as a private individual, of the Norwalk Tire & Rubber Co., Norwalk, Conn. His successful bid in the District Court of the United States for the District of Connecticut, New Haven, Conn., for all the assets of Norwalk in the amount of $2,600,000 was based upon an unaudited balance sheet of December 31, 1949, and was made with certain reservations to cover any diminution of assets found to exist at the time of closing. On June 8 the Court confirmed the plan of sale, and on July 12 the hearing on consummation in the District Court will be held, and it is expected that the transfer of title will be effected at that time.

Lawrence R. Sperberg

Sperberg Joins Huber

Lawrence R. Sperberg has joined J. M. Huber Corp., 342 Madison Ave., New York 17, N. Y., as chief chemist of its carbon black division in Borger, Tex. Mr. Sperberg, who formerly was with Phillips Petroleum Co., has been connected with the development and evaluation of furnace blacks and synthetic rubber for many years. As manager of the chemical division's rubber evaluation and testing sections, he established in 1940 the rubber laboratory at Phillips for the laboratory and commercial development of furnace blacks. He also developed new physical and chemical methods of testing carbon blacks, road test evaluations of tires, and aided in the development of the original "cold rubber."

Prior to joining Phillips, Mr. Sperberg had been with the research department of Goodyear Tire & Rubber Co. and with the Minnesota Mining & Mfg. Co.

Since 1947, he has been chairman of the Abrasion Testing Subcommittee of the Classification and Specifications of Rubber Compounds Section of the SAE-ASTM Joint Committee on Automotive Rubber. He is also the author and co-author of numerous papers in technical journals on various aspects of rubber fabrication, and he has addressed many technical groups on carbon black and "cold rubber" problems and has been issued several patents, with others pending, relating to rubber technology.

He holds a graduate degree in chemistry from the University of Michigan and was a Goodyear Fellow from 1935-36 at the University of Akron.

General Transfers Personnel

Assignment of two Akron employes of The General Tire & Rubber Co., Akron, to positions in Europe was announced recently by C. F. O'Neil, vice president in charge of foreign operations.

Frank Grucella will serve in a technical capacity with R. & E. Huber, Ltd., Zurich, Switzerland. General Tire has a technical affiliation with this company. Grucella has 17 years experience with General Tire. He started in the bead department, worked nights and attended the University of Akron days. He also did graduate work at Akron U. in rubber research, mechanical engineering and physics. Grucella spent five years in the Army and upon his return to General Tire spent two years in charge of airbag tire carcasses and white sidewall tire compounding. He then transferred to tire construction and development, where he worked 1½ years. For the last six months he has handled technical problems for the company's affiliated foreign plants.

William Vecsey will be superintendent of General's affiliated textile plant at Porto, Portugal. Entering the textile phase of the rubber industry shortly after finishing college, Vecsey has nearly 30 years experience in the business. He formerly was factory manager of General Tire's Aldora Mills plant at Barnesville, Ga. A General Tire employe for 17 years, Vecsey was director of textile research and fabric development in the company's domestic operations before assuming his new position.

Promotion of four factory supervisory employes at General Tire was also announced, by Harold Harmon, factory manager.

Charles Corkerton, Jr., becomes general foreman of tire curing and airbag manufacture.

Harvey Scott assumes the position of general foreman of tube manufacture, accessories, final finish and repair.

John Spinner is assigned to special work on fabric conservation.

John Boanny becomes floor foreman in the tube department.

The appointees, except Boanny, will report to Dwaine Edsall, production manager. Boanny reports to Scott.

Organization of a new sales department with J. J. Goldie serving as manager was announced by Vice President L. A. McQueen. In his new assignment as manager of distribution Goldie will be in charge of the complete distribution of all finished goods inventories, casings, tubes, repair material, etc., at the company's Akron and Waco, Tex., plants, and all field warehouses and branches. All branch operating personnel and all Waco and Akron personnel having anything to do with the distribution of finished goods will report directly to Goldie. The traffic department also will report to him, McQueen said.

A General Tire executive since 1926, Goldie has been director of administration since 1946. He joined the company as assistant credit manager and held that position for three years. In 1929 he was appointed general office manager and served in that capacity until becoming director of administration.

The directorate of General Tire on June 5 named Thomas F. O'Neil, of Boston, Mass., as a vice president, and also declared an extra dividend.

President W. O'Neil, in announcing the new vice president, said that there will be no change in the latter's assignment and that he will continue to headquarter in Boston, where he is vice president and director of the Yankee Network, a wholly owned subsidiary of the rubber company.

General's new vice president, second oldest son of W. O'Neil, is also vice chairman and director of the Mutual Broadcasting Co.; president of the Eastern Broadcasting Co., a subsidiary of Yankee Network; and a director of Transit Radio. He has been a General director since December, 1948. A World War II veteran with four years in the Coast Guard, the younger O'Neil has been affiliated with General's Boston and New York operations since his military release.

W. O'Neil last month was elected a director of Brand Names Foundation, Inc., 119 W. 57th St., New York 19, N. Y.

Ad Service for Dealers

An illustrated clipsheet entitled "The General Tire News and Feature Service" is being distributed by General Tire to its dealers for use by local newspapers. The material is so designed that either the story and/or pictures can be used by the newspapers, according to available space. Photographs or stereotype mats of the pictures are available from the company without charge. The May issue features a story, "Industry in Action—A Tire is Born," which describes the steps in the design, manufacture, and testing of General's Silent Safety tire. According to L. A. McQueen, vice president in charge of sales, the name Silent Safety was selected because the tire rolls more smoothly and steers easier than any other tire except the company's Super Squeegee 128 and has a safety factor of 10.5 as compared with the safety factor of seven or less for most tires.

Eide Elected Vice President

Alwin C. Eide has been elected vice president of the American Zinc, Lead & Smelting Co., the parent organization of the American Zinc Oxide Co., Columbus, O., and a major producer of zinc products in the United States.

Eide joined American Zinc as a chemist at Hillsboro, Ill., in 1916, was made branch manager of the Chicago sales office in 1919, and in 1923 came to Columbus as sales engineer of American Zinc Oxide. He was named manager of the pigment division of the company in 1940, which position included management of the company's plant at Hillsboro as well as at Columbus. Eide was made vice president of American Zinc Oxide Co. and also of American Zinc Sales Co. in 1944.

He is also an author and co-author of several technical articles on zinc oxide and is widely known for his promotion of the value of acicular zinc oxide and its use in paint. He belongs to the American Chemical Society, American Ceramic Society, American Society for Testing Materials, Federation of Paint, Varnish & Production Clubs, and the Akron Rubber Group.

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Alwin C. Eide

Carl F. Schnuck

Engineering Changes at Farrel

Farrel-Birmingham Co., Inc., Ansonia, Conn., has appointed Carl F. Schnuck director of engineering and Warren C. Whittum chief engineer.

In his new post Mr. Schnuck will be permitted more time to guide the overall engineering policies of the company, with particular emphasis on the development of new and improved machinery. The responsibilities of directing engineering operations and engineering personnel are now assumed by Mr. Whittum.

Mr. Schnuck first came to the company in 1899, and his half century of engineering experience covers all fields in which the company operates. He was appointed chief engineer and elected to the F-B board of directors in 1945 and previously had been in charge of the company's rubber and plastics machinery engineering.

Mr. Whittum, whose entire career has also been with Farrel-Birmingham, entered its employ in 1930, shortly after graduation from Worcester Polytechnic Institute. He has served as draftsman, estimator, tool engineer, machine shop superintendent, production engineer, and development engineer.

Half-Century with Farrel

The recent presentation of five 50-year service awards at one time is unique in the annals of Farrel-Birmingham. These pins went to Mr. Schnuck, Henry T. King, Roderick R. Hazard, Christopher C. Harris, and Joseph B. Wolfe. These five men, who this year completed 50 years with Farrel-Birmingham, now join a select group which includes ten other active and five retired employes of the company, all with service records of from 50 to 58 years.

These half-century veterans form the senior division of an "Old Timers Club" composed of 336 members who have been with the company 25 or more years. The 50-year pins were presented at the annual party of this organization, along with other service awards which included six 35-year gold wrist watches, one of which was received by the company's president, Franklin R. Hoadley.

Cabot Advances Two

David Duke Cochrane was elected a vice president of Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass., at a recent meeting of the board of directors. Mr. Cochrane joined Cabot in 1932 on a development project, served as director of southwestern research and development at Pampa, Tex., from 1934 to 1940, and then moved to Boston to take charge of the company's general research and development activities. During the war he coordinated the engineering, development, and construction efforts of the company and in 1945 became chief engineer and manager of the new projects section. As vice president, Mr. Cochrane will continue in charge of this work in both the domestic and foreign fields.

Warren C. Whittum

John Andrews has been appointed general manager of Cabot's newly created plasticizers division. With Cabot since 1945, Mr. Andrews has been a member of the technical sales staff for the past four years. As manager of plasticizers, he will also call on the company's customers in this field.

Fred H. Amon, Cabot technical director, has returned from a trip to England, Scotland, France, and Italy, and reports wide interest in the manufacture of reinforcing blacks overseas and a good reception of oil-type blacks. At both Birmingham and Liverpool, England, Mr. Amon presented a paper before the Institution of the Rubber Industry on the manufacture of carbon black in England. Mr. Amon's tour included visits to the rubber companies in the countries traveled and a visit to the new Cabot carbon black plant under construction at Ellesmere Port, England.

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John Andrews

For Footwear Mobilization

The newly organized Leather and Footwear Industry Group of the Quartermaster Association met with Quartermaster Corps industrial mobilization planners on June 8 at the Corps' New York, N. Y., procurement agency office. This meeting was the first of a series relating to industrial mobilization planning, research and development, and current procurement of leather and footwear items. The Group was welcomed by Major General W. H. Middleswart, assistant to the Quartermaster General, and Brigadier General H. L. Peckham, commanding the New York agency.

Raymond A. Mills, vice president of Endicott-Johnson Corp., served as chairman of the meeting which was attended by some 35 prominent industry representatives, including V. N. Hastings, manager of production and control, Naugatuck Chemical Division, United States Rubber Co.; John H. Kelly, Tyer Rubber Co.; and Edgar E. Rand, president of International Shoe Co. The Group was divided into six commodity committees, as follows: leather tanning; leather footwear; machinery and supplies; rubber footwear; lasts; and leather gloves. Mr. Hastings was appointed temporary chairman of the rubber footwear committee pending future elections.

Stowe-Woodward, Inc., Newton Upper Falls, Mass., has announced the resignation, after 18 years of service, of H. B. Shepard, vice president. Although retiring for reasons of health, Mr. Shepard will continue with the company in an advisory and consulting capacity. As the result of this change, the appointment of George E. Stafford as manager of the hard rubber division has been made, it was announced. Besides his new duties, he will remain director of sales and promotion for the bowling ball department.

© *Fabian Bachrach*

David Duke Cochrane

Executive Changes at Goodyear

Ralph H. Miner, manager of the tax and insurance department, has been elected an assistant secretary of Goodyear Tire & Rubber Co., Akron, O., where he started in 1921 in the tax division in the real estate department, was named manager of tax department in 1924 and manager of the combined tax and insurance departments in 1930.

A series of promotions and transfers affecting development personnel in Goodyear plants at Los Angeles, Calif., Topeka, Kan., and Akron, have been announced by R. P. Dinsmore, vice president in charge of research and development.

Phillip W. Drew, technical superintendent at the Los Angeles plant, has been recalled to Akron for a new and important assignment effective September 1. His successor at Los Angeles, reporting for duty on August 1, is C. R. Washburn, now technical superintendent at Topeka. Moving into the vacancy at Topeka is L. H. Bennett, now chief chemist at that plant. L. D. Treleaven, a development compounder at Akron, takes over the duties of chief chemist at Topeka.

Mr. Drew joined Goodyear as a tire builder in 1925 and moved progressively through the ranks as technical service man and department foreman, becoming technical superintendent in 1946. Mr. Washburn went with Goodyear in 1926 and served in Akron, Toronto, Canada, and Java. Returning to this country when the Japanese invaded Java, he became development manager at the Topeka plant and was appointed technical superintendent in 1946.

Mr. Bennett joined the company in 1934 as a member of the production and engineering squadrons. In 1945 he became chief chemist at the Wolverhampton, England, plant, and returned to the United States in 1949 to become chief chemist at Topeka. Mr. Treleaven began his career with Goodyear as a factory office trainee in 1946, moving to compounding later in the same year. He is a graduate of Ohio State University and served with the Army Engineers during the war.

Robert W. Maney, in charge of tire production at Goodyear's Plant 2 in Akron, has been named plant manager of the company's Los Angeles plant. He succeeds Frank A. Steele, who is retiring on September 1 after 40 years of continuous service in Goodyear's production division. Mr. Maney joined Goodyear in 1929 and has held many positions in production and personnel operations in various plants. Mr. Steele was born in Marshallville, O., on May 10, 1884, and started with Goodyear in June, 1910, at the Akron plant. He will continue to reside in San Marino, Calif., following his retirement.

Bruce Wert, formerly in charge of shoe products sales promotion for Goodyear, has been assigned similar duties on products of the tire sales department, according to J. K. Hough, director of advertising. Mr. Wert came to Goodyear in 1937 as a squadron trainee and served in the printing and paper products and sales and sales accounting departments. He was transferred in 1944 to the sales promotion department in charge of mechanical goods promotion.

R. H. Harris, who recently joined Goodyear, has been appointed staffman in charge of shoe products sales promotion, replacing Mr. Wert. H. H. Strahlem, former sales promotion staffman, has been transferred to the advertising department, where he will work on retail newspaper advertising, replacing W. M. Tucker, who has resigned.

Eugene L. Wyman has been appointed Neolite insole representative calling on shoe manufacturers in the East for Goodyear, with his headquarters in Boston, Mass. Mr. Wyman formerly was with United States Leather Co.

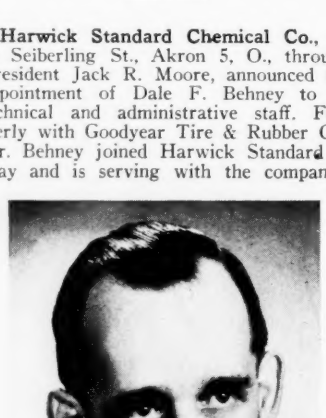
Other Goodyear News

General Latex & Chemical Corp., Cambridge, Mass., has been appointed a distributer in the New England area of Chemigum nitrile-type latices made of Goodyear's chemical division. According to H. R. Thies, division manager, the appointment makes possible continued improvements in the servicing of accounts calling for these latices, which include Chemigum Latex 200, generally used in dipped goods, paper impregnants and coatings, and fabric sizings; and Chemigum Latices 235 and 245, used for paper and textile coatings, impregnants, and sizes, leather finishes, and specialty adhesives.

The installation of seven sets of cross-wind landing wheels on T-6 "Texan" trainers has been announced by the Air Force Air Materiel Command, Wright Field, Dayton, O. The castered wheels, made by Goodyear, are the first to be designed specifically for military aircraft, although an Army plane has been flying with modified commercial cross-wind wheels for more than a year. The seven T-6's will be used to evaluate the equipment in Air Force pilot training. The T-6 was selected because of its ground loop tendencies; the new wheels therefore offer a chance of reducing ground accidents. The wheels are designed to caster 30 degrees on either side of the plane's center line, a provision that will allow the aircraft to land in cross-winds up to 40 m.p.h. in velocity.

E. J. Thomas, president of Goodyear, recently was reelected to the board of the National Industrial Conference Board for a one-year term. Active in the work of the Conference Board for many years, Mr. Thomas was first elected to the board in 1944.

Harwick Standard Chemical Co., 60 S. Seiberling St., Akron 5, O., through President Jack R. Moore, announced the appointment of Dale F. Behney to its technical and administrative staff. Formerly with Goodyear Tire & Rubber Co., Mr. Behney joined Harwick Standard in May and is serving with the company's Akron staff in both a liaison and technical capacity. Mr. Behney joined Goodyear in 1935 and worked on development, tire design, and technical service until 1939. In 1940 he was made a supervisor of a Banbury train and later become compounder for Airfoam development. In 1941 he was promoted to the purchasing department and served as purchasing agent for Goodyear Synthetic Rubber Corp. and then as chemical buyer for Goodyear's chemical division. Mr. Behney is currently vice chairman of the Akron Rubber Group.



Dale F. Behney

Asphalt-Rubber Trial Paving in New York

On June 17 four 100-foot strips of asphalt-rubber trial paving were laid over the granite block pavement near 12th St. on the West Side Highway in New York, N. Y., to furnish comparative tests of the various materials. One of the test strips included a special natural rubber powder, the same as that used in a road outside of Rotterdam, Holland, that has been in operation for 12 years without repair; the second contained synthetic rubber made available by the Goodyear Tire & Rubber Co.; the third contained processed rubber from the Firestone Tire & Rubber Co.; and the fourth strip was paved with the usual asphalt as a control.

Harry Fisher, rubber road consultant to the Natural Rubber Bureau, who was present when the new paving was being laid, commented as follows: "Rubber roads give promise of saving New York taxpayers millions of dollars in lower repair costs. The stretch being laid today and a similar stretch to be laid during the next several weeks will be kept under close observation. If the New York trial bears out the results of other tests, rubber roads could be a big economy and a safety factor in the driving of the future."

The New York stretch of so-called "rubber road" is one of several being built about the country with the collaboration of the Natural Rubber Bureau. Last year similar paving, as well as paving including synthetic and processed rubber supplied by various rubber companies for the asphalt-rubber mixture, were laid in Ohio, Virginia, Texas, Minnesota, and Canada. During the next several months similar stretches will be put down in Massachusetts, Maryland, Florida, and other states.

Although the amount of rubber mixed with the asphalt is only about 0.5%, it has very beneficial effects in raising the softening point and lowering the hardening point of the asphalt-rubber mixture when exposed to extremes of summer and winter temperatures, and also in making it possible for a car to stop in a shorter distance as compared with the stopping distance on the regular asphalt pavement.

The Premier Rubber Mfg. Co., Dayton, O., has established the Joseph F. Westendorf memorial scholarship at the University of Dayton. The new fund honors the memory of a former member of the associate board of lay trustees at the University and was set up by the directors of Premier, including John Westendorf, president; Harry Gerstner, vice president; Joseph L. Liebold, secretary; Louis R. Jacobs, general manager; A. H. Mahrt, and Clarence P. Westendorf. Joseph Westendorf, who died June 6, 1949, was then president of the Premier company.

RECIPE

from the Barrett Rubber Research Laboratory
FOR

CUMAR*
RESIN, LIGHT EX GRADE,
in Natural Rubber

RECIPE

Smoked Sheets	100.00
"CUMAR" Resin, Light EX Grade	10.00
"Philblack" A	62.50
Calcium Carbonate (Precipitated)	50.00
"Silene" EF	25.00
Zinc Oxide	5.00
Stearic Acid	2.00
"Agerite" Alba	1.00
"Sunproof"	1.00
Sulfur	2.50
Benzothiazyl Disulfide	1.00
DOTG	0.25
Total	**260.25**

Specific Gravity	1.37
Rubber Hydrocarbon, % by Weight	38.5
Rubber Hydrocarbon, % by Volume	57.0
Mooney Viscosity, ML, 4 min. @ 212 F.	57.0

Scorch Test: Press Cures @ 250 F.

Minutes	Cure
5	None
10	Slight
15	Fair

Press Cure at 316 F. (70 lb.)—10 Minutes:

Tension and Hardness Data	Unaged	Aged 24 Hrs. @ 100 C.
Stress, 300%, psi.	1500	1600
Tensile, psi.	1900	1700
Elongation, %	400	310
Hardness, Shore A	79	82
Tear-Resistance, Angle, lb./1-in. thickness	185	145

Press Cure at 316 F. (70 lb.)—15 Minutes:

Abrasion Resistance, du Pont cc. loss/ hp-hr.	275	300
Compression Set, 25% Constant Deflection, %	43	—
Resilience, Yerzley, 20% Deformation, %	44	33
Rebound, Goodyear-Healey, %	53.0	47.8
Contact Stain (24 hrs. @ 175 ±2 F.)	Slight	—
Migration Stain (24 hrs. @ 125 ±2 F.)	Slight	

To confer efficient and safe processibility, and to impart smooth and rapid calendering and extruding properties, "CUMAR" resin, light EX grade, is an exceptionally effective processing aid. It has found wide application in the compounding of natural rubber and synthetic elastomers.

Its reinforcing feature modifies the nerve of the rubber, minimizes shrinkage, and prevents sagging and flattening in open steam and air cures. Its extending character improves physical properties, and permits higher filler loading, thereby reducing compounding costs. The light EX grade of "CUMAR" resin is also extremely valuable for improving cut-growth resistance, and hot and cold tear-resistance.

In the design of automotive and aeronautical parts, mechanical and proofed goods, flooring, matting, bumper and channel stocks, and in items which are to be used in contact with dark-colored enamels and lacquers, "CUMAR" resin, light EX grade, promotes quality along with economy.

Barrett*

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ALLIED CHEMICAL & DYE CORPORATION
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White, Norton, Brooks Advanced by U. S. Rubber

Elmer H. White, vice president and general manager of the footwear and general products division, United States Rubber Co., Rockefeller Center, New York 20, N. Y., has been promoted to a new post in which he will serve as an adviser to the president, the executive committee, and the general managers on sales, sales promotion, advertising, and distribution, effective July 1. Walter H. Norton, assistant general manager of the division, has been elected vice president and general manager to succeed Mr. White. Chester J. Noonan, general sales manager of the division, succeeds Mr. Norton as assistant general manager.

Mr. White began his career with U. S. Rubber as a stock boy in the company's San Francisco warehouse 47 years ago. He later became a salesman and then a branch sales manager of the footwear division, holding sales management positions in Oakland, Sacramento, and Spokane. He was named footwear sales manager of the Pacific Coast division in 1925, general sales manager of the division in 1938, and assistant general manager in 1939, general manager of the division in 1944, and company vice president in 1945.

Mr. Norton has been with the company for 39 years, starting as a stock clerk in Boston. He became assistant superintendent of the Naugatuck, Conn., footwear plant in 1915 and production superintendent in 1919. He was appointed factory manager of the Williamsport, Pa., plant in 1921 and of the Naugatuck plant in 1928. In 1941 he became production manager of the footwear division and was named assistant general manager in 1943.

Mr. Noonan came to the rubber company 31 years ago as a clerk in the footwear and clothing department at Great Falls, Mont., and became a salesman in Butte a year later. He was made footwear sales manager in Salt Lake City in 1922 and in Los Angeles in 1929. He became regional sales manager in 1931, Pacific Coast divisional sales manager for the footwear department in 1933, manager of clothing and coated fabric sales for the footwear division in 1938, and division general sales manager in 1943.

Arthur E. Brooks has been appointed manager of United States Rubber Co.'s general laboratories at Passaic, N. J., according to S. M. Cadwell, director of research and development. Dr. Brooks, after attending Johns Hopkins University and the University of Chicago, served in the ordnance department during World War I and later taught mathematics and chemistry in high schools in Illinois and at McKendree College. He joined U. S. Rubber in 1929 as a research chemist at the general laboratories, where he eventually worked on a number of important projects, including the adoption of rubber separators for use in storage batteries and the development of Hydron, an absorptive form-lining used in molding faces of concrete structures. From 1941 to 1944, Dr. Brooks was technical director of the company's munitions division with headquarters at Des Moines, Iowa. He returned to Passaic in 1944 as head of the department of physical research and one year later was placed in charge of organic research. This promotion was followed by his appointment in 1947 as assistant to the director.

Dr. Brooks, who has contributed several papers to leading scientific journals, is a member of the American Chemical Society, the American Association for the Advancement of Science, and Sigma Xi, honorary scientific society.

Transfers Marvinol Sales Offices

Transfer of sales and technical service headquarters for Marvinol vinyl resins from Baltimore, Md., to Naugatuck, Conn., was announced June 12 by Naugatuck Chemical Division. All laboratory equipment at Baltimore has been moved to Naugatuck. In addition, Marvinol sales and technical service personnel now have available to them the extensive laboratories and testing equipment of the Naugatuck Chemical plant. The result is an expanded vinyl research and development program more closely coordinated with customer requirements and the overall work of the division, John P. Coe, vice president and general manager of the division, explained.

Approximately 65 sales and technical service personnel have moved to Naugatuck, including Harold M. Parsekian, manager of vinyl sales, who will make his headquarters there.

Gives *Hevea* Trees to Conservatory

Phipps Conservatory, Pittsburgh's famed botanical gardens, was presented with two *Hevea* rubber trees on June 1 to help round out its collection of rare plants and shrubs gathered from all parts of the world. Measuring some 14 feet in height and shipped under carefully controlled temperature conditions, the trees were a gift from U. S. Rubber to Pittsburgh's school children and were accepted on behalf of the city by Mayor David Lawrence.

Receives Safety Award

U. S. Rubber received the National Safety Council Distinguished Service to Safety award in a ceremony on June 19 at the company's Eau Claire, Wis., tire plant. The award was presented to President Harry E. Humphreys, Jr., by Ned H. Dearborn, president of the Council. The award is made annually to the organization which achieves significant accident prevention records and marked safety improvement. During 1949, U. S. Rubber reduced its accident severity by 35%, lost-time accidents by 34%, and number of lost-time days by 46%. This achievement covers 44,000 persons who worked 86,000,000 man-hours.

Two additional awards were also made at Eau Claire: the plant won the firm's Safety Contest President's Prize of $300 and Certificate of Merit by taking first place in the annual company safety contest; and J. W. McGovern, vice president and general manager of the tire division presented the General Manager's Safety Trophy to Howard C. Hutchens, Eau Claire plant manager, for winning the tire division safety contest.

Marketing New Tractor Tire

The U. S. Royal Grip Master, a new all-purpose tractor tire designed for farm use in every kind of soil and with every type of crop, has also been announced by U. S. Rubber. Pointing out that business analysts have indicated that the American farmer has stepped up his long range program of mechanization, President Humphreys said that his company had determined to aid the farmer by providing farm tires of the same high quality as those provided for passenger cars and trucks. The U. S. Royal Grip Master is the result of extensive tests conducted at the Tillage Machinery Laboratory Soil Plots, Auburn, Ala. Features of the new tire include a new tread design for greatest possible traction efficiency, and rugged carcass construction. The tread has an open center for positive self-cleaning action and full width bite for greater power and traction. Lug bars are curved slightly at the shoulder to provide maximum bar stability. The lugs are supported by buttresses to prevent layback and irregular wear and reduce slippage. The tread center is reinforced with additional rubber to give smoother hard surface riding and longer wear.

Report from Goodrich

Henry E. Heilman, operations manager of International B. F. Goodrich Co., a division of the B. F. Goodrich Co., Akron, O., has been named vice president—sales, of the division He has been with B. F. Goodrich since 1926. From 1931 to 1938, he was a member of International Goodrich; his duties took him to the Far East, Netherlands, South Africa, and Japan. In June, 1942, he became district operating manager of the company's Akron tire division, rejoining the International company in August, 1945. In his new capacity Heilman succeeds Wm. E. Ireland, now a sales executive in B. F. Goodrich Co. of Canada, Ltd.

A new program of research and development in vinyl upholstery for furniture and other applications has been announced by Goodrich's plastics division, Marietta, O. According to C. O. DeLong, division general manager, greater attention will be given to improved constructions designed to serve new uses and special requirements of the furniture and allied industries. As part of the expanded program, Comprehensive Fabrics, Inc., national distributer of Goodrich's Koroseal materials, will concentrate on designing as well as merchandising.

Goodrich chairman and president, John L. Collyer, was awarded an honorary degree of Doctor of Laws at the commencement exercises of Marietta College on June 4.

Brazilian Chemist Studies Rubber Industry

Under the auspices of the foreign industrial training program being carried on by the United States Labor Department's Bureau of Apprenticeship, Roberto S. Nasser, chief chemist of Orion Factories, Inc., Sao Paulo, Brazil, will receive 10 months of advanced industrial training in this country. A chemist in the Brazilian rubber industry for 10 years, Nasser arrived here late in May and will spend the first three months of the training period with the Dayton Rubber Co., Dayton, O. There he will study advanced techniques and procedures of rubber manufacturing and learn the usage of modern American machinery.

Later Nasser will spend three months at the Gidley Research Institute, Fairhaven, Mass., where he will study advanced technological and scientific processes related to the rubber industry. The remainder of his time in the United States will be spent in various other factories and laboratories which will offer knowledge of value to the Brazilian rubber industry.

NEWS ABOUT PEOPLE

Donald E. Mason has been named general sales manager of Colonial Rubber Co., Ravenna, O., according to Howard Farkas, executive vice president of The U. S. Stoneware Co., and its affiliated companies. Mr. Mason was with The B. F. Goodrich Co. for more than eight years, gaining wide experience in the rubber industry—especially in solving special or custom molding problems. He had joined the company upon receiving his B.S. degree in marketing from Ohio State University in 1938. During the war he was with the Atlas Powder Co., rejoining Goodrich at the end of the war in the sundries sales division of the industrial products department.

Frederick C. King has been appointed technical representative of the synthetic fibers department, Carbide & Carbon Chemicals Division, Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. His previous connections include Burlington Mills and E. I. du Pont de Nemours & Co., Inc. During the war Mr. King served in the Navy at Oak Ridge, Tenn., on the Manhattan Project, and at Camp Dietrich, Md., in Chemical Warfare Service.

John C. Cotner has been named president of The Hydraulic Press Mfg. Co., Mt. Gilead, O. In the past, Mr. Cotner had served as vice president and general manager and later as president of the Logansport Machine Co., Inc., as vice president of the Gerotor May, Inc., and as president of the Consolidated Industries.

Walter Putz, representing Soc. Ind. de Borracha Elastic, S. A., Rua Abilio Seares, Sao Paulo, Brazil, who is interested in machinery and techniques used in connection with the manufacture of rubber products, arrived in the United States last month on a 3-4 months' trip. He plans to visit New York, Akron, Washington, Detroit, and Cincinnati. He may be reached at Binney & Smith Co., 41 E. 42nd St., New York 17, N. Y.

Harold B. Leland, manager of industrial relations, has been appointed vice president in charge of manufacturing for the Hood Rubber Co., Watertown, Mass., a division of The B. F. Goodrich Co.

Mr. Leland has been manager of employe and industrial relations at Hood since 1937, following a six-year tenure as divisional superintendent in charge of calendering and cutting on footwear and all miscellaneous products. He joined the company in 1917, after graduating from Tufts College as a chemical engineer. After two years with the Navy in World War I he returned to Hood, where he was employed in the laboratory technical service department. He has been with the company ever since.

During World War II, Mr. Leland served as a panel member of the Regional War Labor Board. He is also a director of the Massachusetts Blue Shield, a member of the Boston Chamber of Commerce, and serves on the manufacturing committee of The Rubber Manufacturers Association, Inc.

G. W. Stephens *(Center)*, President and Board Chairman of Mansfield Tire & Rubber Co., Examines Some of 2,600 Birthday Greeting Cards from Employes; with Him Are *(Left)* R. R. Weaver and Louis Heuss, President and Vice President, Respectively, of the Company's 25-Year Club

G. W. Stephens, chairman of the board and president for 27 years of Mansfield Tire & Rubber Co., Mansfield, O., was showered with more than 2,600 greeting cards from employes on the occasion of the seventieth birthday. In addition, Mr. Stephens was presented with a silver tray as a token of his years of community service.

Paul Codman Cabot, of Brookline, Mass., has been elected a director of The B. F. Goodrich Co., Akron, O. He is president of the State Street Investment Corp., Boston, and treasurer of the President & Fellows of Harvard College.

Charles S. Craigmile, president, Belden Mfg. Co., Chicago, Ill., recently was elected a director of the American Management Association, 330 W. 42nd St., New York, N. Y.

WEST

"PB" Rubber, a New Synthetic

Phillips Petroleum Co., Bartlesville, Okla., through President K. S. Adams, has announced the development, in cooperation with the Office of Rubber Reserve, of a new synthetic rubber called polybutadiene, or "PB" rubber. Limited road tests are said to indicate that the new rubber is superior to GR-S and perhaps to natural rubber for tire treads, and that it may even be equal to "cold rubber" in quality.

In making the announcement Mr. Adams noted that the current critical shortage of benzene from which styrene is made has prevented a rapid increase in production of GR-S to meet the rising demand. The new rubber is made only from butadiene and requires no styrene, and butadiene production can be increased in existing plants.

Previous attempts to make polybutadiene rubber commercially were unsuccessful because the rubber obtained was difficult to process and had poor physical properties. A polybutadiene rubber suitable for use in tires was finally obtained in the Phillips laboratories by making it much softer than usual, with a modified recipe and at moderately low temperatures. In the new process high abrasion furnace black is mixed with the polybutadiene latex before conversion to solid rubber. Production of the new rubber for use in the manufacture of thousands of tires for further proving on highways had been scheduled by ORR for June.

1949 Safety Statistics

Industrial injury rates for last year, released by the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill., show a substantial reduction in both the frequency and severity of 1949 accidents, as compared with those of 1948. Of the 40 basic industry classifications, 38 reduced their accident frequency rates, and 28 lowered their severity rates. The average accident frequency rate for employes in 1949 was 10.14 disabling injuries per 1,000,000 man-hours, a reduction of 12% from the previous year's figure. The 1949 average accident severity rate was 1.02 days lost per 1,000 man-hours, 9% below the 1948 figure.

The rubber industry had an accident frequency rate of 5.10 in 1949, a reduction of 39% from the 1948 level, and placed fifth in the list of 40 industry classifications. The 1949 accident severity rate for the rubber industry was 0.51, a decrease of 22% from the previous year, to place the industry in eleventh place among the other industries.

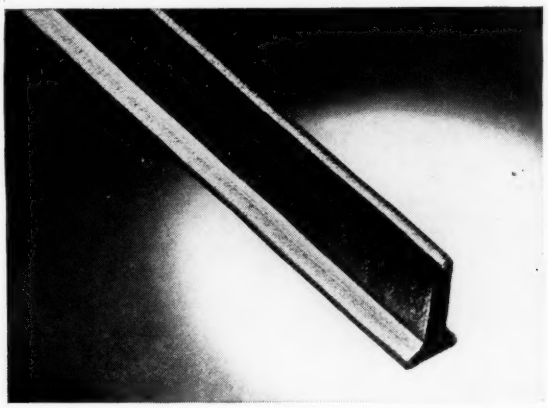
Bemis Bro. Bag Co., 408 Pine St., St. Louis 2, Mo., has granted two fellowships for the study of its company organization and operation under a national program designed to encourage an exchange of information between college staff members and businessmen. The fellowships were granted through the Foundation for Economic Education, Inc., which established and directs the College-Business Exchange Program. Under this program, fellowships are offered to college teachers for a six-week summer period during which they make an intensive study of a business firm in order to gain first-hand experience in business and a better understanding of business problems. At the same time the program acquaints businessmen with problems faced in the classroom. The six-week study is done largely through interviews with supervisory and executive personnel in the company. The company participating in the program pays the fellows their transportation costs and a set sum to cover living expenses during the study period.

Ferro Chemical Corp., Bedford, O., has appointed Van Waters & Rogers, Inc., sales agent for the Northwest territory, consisting of Washington and Oregon, for Ferro products of metallic soaps, driers, and stabilizers for the paint and varnish, printing ink, petroleum, textile, marine, plastic, lumber, and rubber industries. Van Waters has offices at 400 First Ave. S., Seattle 4, Wash.; 3950 Northwest Yeon Ave., Portland 10, Oreg.; and N. 809 Washington St., Spokane 11, Wash.

points of interest

ABOUT "COLD RUBBER" AND CONTINEX SRF

- Smooth tubing shown in the illustration can be achieved more economically with no sacrifice in processing safety and speed.
- Approximately 35% higher loadings of Continex SRF, formerly impossible with smooth-out HMF.
- Continex SRF in "Cold Rubber" enables the production of smooth tubing-channel compounds having minimum radial swell heretofore impossible with GR-S.
- Satisfactory compounds similar to the illustration can be produced containing from 0 to 50 parts reclaim per 100 parts "Cold Rubber."
- A non-staining Continex SRF can be supplied for specialty items where staining is objectionable.



Samples of Continex SRF and Continex SRF-NS (Non-staining), as well as formulations, will be supplied on request.

Also, for more complete information, write for Technical Service Report CB-3 "Smooth Tubing *Cold Rubber* Channel Compounds."

Continex SRF *can also be used in* natural *rubber smooth tubing-channel compounds with up to 35% higher loadings than are possible with a smooth-out type HMF black. Technical Service Report CB-2 gives details. Write for your copy* today!

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Wyandotte Chemicals Corp., Wyandotte, Mich., has purchased the Pacific Chemical plant of American-Marietta Co., Los Angeles, Calif. According to company President Robert B. Semple, Wyandotte will immediately revamp the property to provide a Pacific Coast manufacturing unit to serve the firm's branches in Los Angeles, San Francisco, and Seattle. Pacific Chemical's plant and sales personnel will be absorbed by Wyandotte's Pacific division, and the Wyandotte research and technical service staffs, numbering nearly 200 persons, will become available to users of Pacific Chemical products as well as Wyandotte customers. Wyandotte executives handling the acquisition included Ford Ballantyne, Jr., vice president, George H. Schwarz, vice president and controller, and Robert L. Reeves, general sales manager of the J. B. Ford Division.

Phillips Chemical Co., Bartlesville, Okla., through President K. S. Adams has announced that the government-owned Plains butadiene plant which it operates has received the National Safety Council Award of Honor for Distinguished Service to Safety. The award was presented to the plant for working 3,001,629 man-hours without a lost-time injury. G. G. Oberfell, vice-president of research and development for Phillips Petroleum Co., the parent company, was principal speaker at the award ceremony and presented the award to W. C. Hewitt, superintendent of the Plains plant, which is located near Borger, Tex. As of May 11, the plant's safety record had reached 3,339,410 man-hours and was still unbroken.

CANADA

Simpson Buys Gutta Percha

All shares of Gutta Percha & Rubber, Ltd., Toronto, Ont., have been acquired by M. O. Simpson and associates, it was announced June 15. Mr. Simpson becomes president and board chairman of the company; J. Ross Belton is vice president and general manager; and J. M. Allison is secretary-treasurer. Other directors in addition to the officers are C. S. Band, H. C. Walker, Claud S. Richardson, and M. O. Simpson, Jr. Mr. Simpson is also president and director of Combined Enterprises, Ltd., which controls the following wholly owned subsidiaries: Stuart Bros. Co., Ltd.; Snap Co., Ltd.; and Conant Paint, Ltd.

"Gutta Percha & Rubber, Ltd., is the largest all-Canadian rubber company specializing in mechanical rubber products, footwear, and automotive accessories," Mr. Simpson said. "The change in ownership will in no way change that feature."

William E. Ireland, since December 1, 1949, vice president-sales of International B. F. Goodrich Co., has been named vice president-general manager of the tire sales division of B. F. Goodrich Co. of Canada, Ltd., Kitchener, Ont. Mr. Ireland has been with B. F. Goodrich for 16 years and had been merchandise manager of International B. F. Goodrich for two years before becoming vice president. He was loaned to the United States Government War Production Board as a "dollar a year man" as chief of that agency's tire and and tube production division, returning to Goodrich in 1945 as manager of replacement passenger tire sales before joining the foreign trade division of his company.

Auditor-General Watson Sellar, discussing Polymer Corp., Ltd., Sarnia, Ont., before the Canadian House of Commons' public accounts committee, said that he had no adverse comments to make on the operation of the government-owned company which is "improving all the time." Mr. Sellar said that Polymer Corp. has a net profit of more than $400,000 in 1949, and that sale of goods in the United States and purchases from that country had resulted in a net surplus of $3,000,000 in U. S. dollars.

OBITUARY

Julius Muehlstein

JULIUS MUEHLSTEIN, treasurer and a director of H. Muehlstein & Co., Inc., New York, N. Y., died in a New York hospital, following a long illness, on June 15. The 59-year-old executive was also a director of H. Muehlstein & Co. (London), Ltd., and a director and treasurer of H. Muehlstein & Co. (Canada), Ltd.

Mr. Muehlstein entered the rubber industry shortly after his graduation from school. When his brother Herman organized H. Muehlstein & Co., the deceased and another brother, Charles, became partners in the business. When the company was incorporated, Julius Muehlstein became treasurer and a director, the positions he held at the time of his death.

He was also very active in the Scrap Rubber Institute, having served as its president, and in the National Association of Waste Material Dealers, having served for many years as a director, a member of the executive committee, and vice president. In addition he was a member of the Metropolis Country Club, Inwood Country Club, and City Athletic Club.

Julius Muehlstein

Funeral services were held June 18 at Central Synagogue, New York, followed by burial at Salem Fields Cemetery.

Surviving Mr. Muehlstein are his wife; his brothers, Herman and Charles, the former, chairman of the board of H. Muehlstein & Co., Inc.; and two sisters.

C. A. Richards

THE Midwest sales manager for Russell Mfg. Co., Middletown, Conn., C. A. "Dick" Richards, died suddenly at his Clearwater, Fla., home on June 3. He had been with Russell for the past 25 years.

Mr. Richards was born in Tacoma, Wash., February 24, 1894. He joined Russell as a salesman in Tacoma and later became division manager in Atlanta, Ga., before becoming Midwest sales manager. In addition he operated the Midwest Automotive Warehouse in Chicago, Ill.

A member of the Automotive Booster Club, the deceased also belonged to the Society of Automotive Engineers, and the Lake Shore Club of Chicago.

Surviving Mr. Richards are the widow and two daughters.

Carl A. Judsen

CARL A. JUDSEN, president and founder, in 1891, of Judsen Rubber Works, Inc., Chicago, Ill., died May 18 in a Chicago hospital following several years of illness. The rubber company executive was 83.

Funeral services were held May 20 in Moody Memorial Church, Chicago, followed by burial in Rosehill Cemetery.

Surviving Mr. Judsen are a daughter, three sons, five grandchildren, three great-grandchildren, and a sister-in-law.

Henry T. Gillen

HENRY T. GILLEN, until his retirement two years ago consulting superintendent of the Goodyear Tire & Rubber Co., Akron, O., died May 23 after a long illness.

Mr. Gillen was born in Akron, January 5, 1880, and attended Kent School and Actual Business College.

In 1901 he joined Goodyear as an employe in the shipping room, of which he later became foreman. In 1911 he was made general foreman of solid tire manufacture and then in 1914 was moved to a division foreman's post. He was named superintendent of the service divisions in 1918, superintendent of Plant I eight years later, superintendent of Plant II in 1932, and then returned to Plant I in 1936. In 1940 the deceased was appointed consulting superintendent. Prior to joining Goodyear he had worked for the B. F. Goodrich Co. for three years and Buckeye Rubber Co. for a short time.

Mr. Gillen was a Republican, a 32nd degree Mason, and a member of Joppa Lodge 66, F. and A. M., Bethany Commandery 72, Knights Templar, Tadmor Temple of the Shrine, and the Akron Elks Lodge.

Funeral services were held May 26 at Billow's Chapel, Akron, followed by burial in Rose Hill Burial Park.

Surviving are the widow, a daughter, and a son.


July,

RETARDER PD

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RETARDER PD® is the proved anti-scorch agent that gives remarkable results even in hot weather.

This non-toxic, fine white powder gives good retarding or anti-scorch effects at processing temperatures, with very little or no retarding effects at curing temperatures. Practically non-discoloring, it is ideal for use in white and light-colored stocks.

RETARDER PD works well with the thiazole type of accelerators, or with combinations of the thiazole and guanidine accelerators or thiuram disulfides. It does not affect the physical properties or aging qualities of vulcanized stocks.

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SALES REPRESENTATIVES AND WAREHOUSE STOCKS: Akron Chemical Company, Akron, Ohio • Ernest Jacoby and Company, Boston, Mass. • Herron & Meyer of Chicago, Chicago, Ill. • H. M. Royal, Inc., Los Angeles, Calif. • H. M. Royal, Inc., Trenton, N.J. • In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto

George E. Jeandheur, Sr.

THE president of the Elmhurst Rubber Co., Inc., Elmhurst, N. Y., George E. Jeandheur, Sr., died May 1 at his Great Neck, L. I., home. Though he had been attending the office until the beginning of this year, he had never fully recovered from a stroke suffered in 1941.

Born in Brooklyn, N. Y., May 29, 1881, Mr. Jeandheur attended Bryant and Stratton Business College before he began his career in the rubber industry with the New Jersey Car Spring & Rubber Co. He rose to the position of secretary of that company and remained there until 1920 when he joined the Mayflower Rubber Works Co., where he became superintendent and then vice president. Later he became president and treasurer of the Middlesex Rubber Co. In 1925 he helped form Elmhurst Rubber and became vice president, treasurer, and general manager, and in 1939 succeeded to the presidency.

The deceased was a member of the Elks Great Neck Lodge, the Blizzard Men of 1888, and the Chamber of Commerce, Borough of Queens.

Funeral services for Mr. Jeandheur were held at his home in Great Neck on May 3, followed by burial on May 4 at Nassau Knolls Cemetery, Port Washington, N. Y.

Surviving are the widow, two sons, and a daughter.

George B. Hodgman

GEORGE BARKER HODGMAN, in recent years an associate of Francis I. du Pont & Co., stockbrokers of New York, N. Y., and before that president and then director and chairman of the board of the Hodgman Rubber Co., Framingham, Mass., died in a New York hospital on June 9. He was 84 years old.

In 1909, Mr. Hodgman became president of the company which had been founded by his grandfather in 1838. In 1924, George Hodgman became a director and chairman of the board, the positions he retained until he left the company in 1925.

During the years the deceased was active in the rubber industry he served as a director of the Rubber Manufacturer's Mutual Insurance Co., as president of the Rubber Club in 1913, as a member of the executive committee of the Rubber Sundries Manufacturer's Division and as treasurer of the Rubber Association of America in 1924, and as a member of the committee on arbitration of the New York Chamber of Commerce.

Funeral services for Mr. Hodgman were held June 13 at Christ Church Methodist, New York, followed by private interment.

Surviving are two sons and a grandson.

Winthrop W. Benner

WINTHROP WEBSTER BENNER, executive vice president of Lee Rubber & Tire Co., Conshohocken, Pa., until his retirement four years ago, died June 10 at his home in Arcola, Pa.

Mr. Benner was born in Minneapolis, Minn., 69 years ago. He was graduated from the University of Minnesota.

Before coming to Lee the deceased had been with Firestone Tire & Rubber Co. for many years, where he had served as manager of Plant No. 2 and assistant to the vice president in charge of subsidiary plants, and with Hood Rubber Co., where he had assisted the general superintendent along special lines. In 1926 he joined Lee and in 1927 was made vice president in charge of manufacturing. In 1943 he became president of the National Synthetic Rubber Co., of which Lee was one of the five operators for the government.

Vinylite Plant

(*Continued from page* 433)

Division of Union Carbide and is scheduled for operation by mid-1951.

Mr. McLaughlin further said, "Vinylite resin VYNV.3 has been produced on a pilot-plant scale for about two years and has demonstrated its value by making possible improved plastisols that speed up production of many products. This new material combines the advantages of greater ease and speed in compounding, fabricating and finishing operations, such as impregnating, dip coating, and slush molding."

Vinylite dispersion resin VYNV.3 is used in the production of such items as dolls, women's and children's overshoes, draperies, intricately shaped elastomeric industrial parts, flooring, upholstery fabrics, awnings, wire insulation, wallpaper, shelf paper, coated foils, dish drainers, refrigerator shelves, work gloves, and many other products.

Swedish Federation

(*Continued from page* 437)

Frisk, Varnamo Rubber Co.; and Anders Rydin, Gislaved Rubber Co.

Four papers were presented at the meeting, as follows: "The Future of Natural and Synthetic Rubber," W. J. S. Naunton, Imperial Chemical Industries, Ltd. (England); "Continuous Vulcanization of Cables from Three Hours to 12 Seconds," Mr. Sarno; "Cold Rubber," Mr. Holmes; and "The Government's Program on Raw Materials," S. Huss, Swedish Government Industrial and Trade Commission. The meeting concluded with a banquet at the Standard Hotel, where congratulatory talks were given by the many prominent guests present. On April 15 the members of the organization were the guests of Goodyear at a luncheon and tour of the company's plant, the largest tire plant in Sweden.

The address of the Federation is: Sveriges Gummitekniska Forening, Hamngatan 12, Stockholm, Sweden.

Chlorine Properties Chart

THE principal thermodynamic properties of chlorine are shown in convenient graph form in a chart, "Enthalpy-Temperature Diagram for Chlorine," available from Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, O. Printed in two colors on heavy-coated stock suitable for mounting, the chart gives the heat content of chlorine liquid, saturated gas, and superheated gas in the temperature range of —40 to 560° F. and at absolute pressures of 15 to 1,100 p.s.i. The chart will prove of great interest and value to research, development, design, and production engineers in connection with equipment involved in any industrial process using chlorine.

FINANCIAL

Armstrong Rubber Co., West Haven, Conn., and wholly owned subsidiary. Twenty-five weeks ended March 26, 1950; net income, $351,543, equal to 82¢ each on combined 313,192 Class A shares and 53,380 Class B common shares; net sales, $14,488,869.

Lee Rubber & Tire Corp., Conshohocken, Pa. Six months ended April 30: net profit, $816,361, equal to $3.22 each on 253,584 capital shares, contrasted with $743,963, or $2.93 a share, in the six months ended April 30, 1949; net sales, $13,918,560, against $15,503,592; income taxes, $567,000, against $516,800.

Philadelphia Insulated Wire Co., Philadelphia, Pa. For 1949: net loss, $96,709, against net loss of $46,995 in 1948; net sales, $1,431,199, against $2,058,042.

O'Sullivan Rubber Corp., Winchester, Va. First quarter, 1950: net income, $39,000, equal to 8¢ a common share, contrasted with loss of $4,087 (revised figure) in the March, 1949, quarter.

United States Rubber Co., New York, N. Y. Initial quarter, 1950: net earnings, $3,927,375, equal to $1.49 a share, against $3,375,069, or $1.18 a share, in the corresponding quarter last year; consolidated net sales, $130,331,500, against $121,510,511.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	Pfd.	$1.75 q.	June 30	June 19
Borg-Warner Corp.	Pfd.	0.87½ q.	July 1	June 14
Dewey & Almy Chemical Co.	Com.	0.40 incr.	June 20	June 12
Dunlop Tire & Rubber Goods Co., Ltd.	5% Cum. Red. First Pfd.	2½% s.	June 30	June 15
Endicott Johnson Corp.	Com.	0.40	July 1	June 20
	Pfd.	1.00 q.	July 1	June 20
Faultless Rubber Co.	Com.	0.50	June 26	June 15
General Tire & Rubber Co.	4¼% Pfd.	1.06¼ q.	June 30	June 20
	3¾% Pfd.	0.93¾ q.	June 30	June 20
	3¼% Pfd.	0.81¼ q.	June 30	June 20
	Com.	0.50 extra	July 3	June 23
Hewitt-Robins, Inc.	Com.	0.25 q.	Sept. 15	Aug. 29
O'Sullivan Rubber Corp.	Pfd.	0.25 accum.	July 1	June 15
Raybestos Manhattan, Inc.	Com.	0.50 incr.	June 12	May 26
Rome Cable Corp.	Com.	0.15	July 1	June 16
	Pfd.	0.30 q.	July 1	June 16
A. G. Spalding & Bros, Inc.	Com.	0.25 q.	June 5	June 18

Carlisle ups tube output with Taylor Control

THE Carlisle Tire and Rubber Company of Carlisle, Pa., makes high quality tubes for automobile, truck and airplane tires. By using Taylor automatic temperature control on existing equipment, *they've sharply increased tube production with fewer rejects.*

Those presses (below) were made for Carlisle by the McNeil Machine and Engineering Company. Molding temperature in each press is controlled by a Taylor FULSCOPE* Temperature Controller (not shown) with its bulb in the condensate discharge, using Taylor's System of Induced Steam Circulation. This is one of hundreds of such systems now operating successfully on unit vulcanizers and platen presses. A FLEX-O-TIMER* Time Cycle Controller (shown) above each press actuates a Diaphragm Valve and automatically controls the entire molding cycle, from the closing of the press to the end of the cure, including the opening of the press.

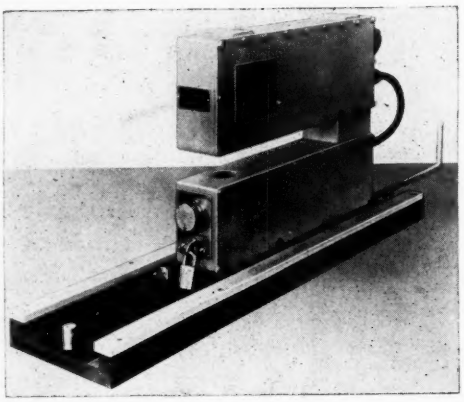
Carlisle bought their first Taylor instruments 24 years ago. They're still using some of those original instruments and report—"Running perfectly!" When modernizing present, or ordering new equipment, specify "Taylor-equipped, as usual!" Or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

*Reg. Trade-Mark

Taylor FLEX-O-TIMER Time Cycle Controllers on a line of McNeil tube molding presses at Carlisle Tire and Rubber Company, Carlisle, Pa. Once the operator pushes a start button, Timer automatically controls whole operation, relieving him for other duties.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

New Machines and Appliances



Pratt & Whitney Beta Ray Continuous Gage

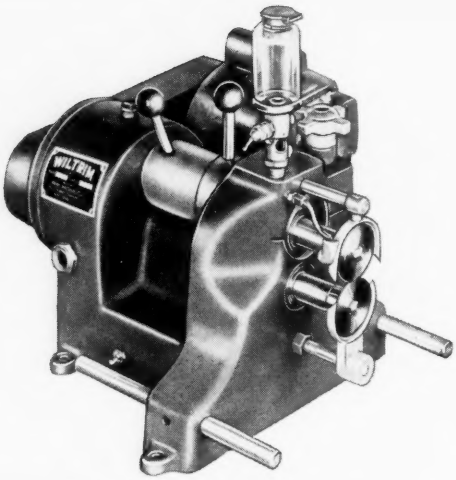
Continuous Thickness Gage

RADIOACTIVE isotopes are used for the gaging of continuous strip materials in a new instrument offered by Pratt & Whitney, Division of Niles-Bement-Pond Co., West Hartford, Conn. Called the Beta Ray Continuous Gage, the instrument is non-contacting and will measure the thickness of materials that are wet, sticky, highly polished, or soft. The gage operates in conjunction with a standard meter, and will indicate any deviation in the thickness of strip or sheet materials, including steel, tin plate, brass, aluminum, rubber, plastics, paper, textiles, and other compositions.

Essentially a weighing device, the instrument measures the weight per unit area of the moving strip by passing a small beam of beta rays through the strip. It may be calibrated in percentage of deviation in weight per unit area, or in decimal dimensions, and gives readings accurate to 1%. With strontium 90 as the source material the range of the gage is from five to 150 ounces per square yard, and with a ruthenium 106 source the range is 50-300 ounces per square yard.

The normal throat depth of the gaging head is 12 inches from the center line of the radioactive beam, but a two-piece gaging head with traverse mounting can be supplied for scanning the entire width of a sheet. If desired, the gage may be used with a standard recorder, operating in conjunction with process control or alarm signal circuits.

SEE PAGE 382

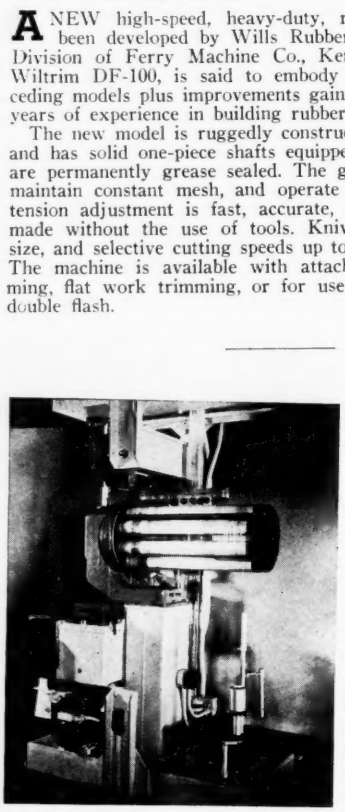


Wiltrim DF-100 Rotary Knife Trimmer

New Trimming Machine

A NEW high-speed, heavy-duty, rotary knife trimmer has been developed by Wills Rubber Trimming Machine Co., Division of Ferry Machine Co., Kent, O. The new machine, Wiltrim DF-100, is said to embody the best features of preceding models plus improvements gained from the company's 35 years of experience in building rubber trimmers.

The new model is ruggedly constructed of steel and cast-iron and has solid one-piece shafts equipped with ball bearings that are permanently grease sealed. The gears are scissor mounted, maintain constant mesh, and operate in an oil bath. Lap and tension adjustment is fast, accurate, and positive and may be made without the use of tools. Knives are standard 2½-inch size, and selective cutting speeds up to 1,725 r.p.m. are featured. The machine is available with attachments for circular trimming, flat work trimming, or for use on items with single or double flash.



Kuljian Miracle Spinner for Continuous Spinning and Processing of Yarns

Rayon Spinner

THE Kuljian Miracle Spinner, a revolutionary continuous spinning and processing machine for the production of rayon yarn, has been announced by Kuljian Corp., Philadelphia, Pa. The machine is said to require 3½ minutes to process rayon from the viscose solution to the finished yarn on the bobbin, as compared with four to five days required by the customary "pot-spinning" method. The new machine spins, regenerates, desulfurizes, bleaches, dries, twists (if desired), and finally packages the yarn in one constant operation. Unlike conventional inflexible systems of spinning, the Kuljian machine may be adjusted to produce a wide range of rayon yarns, varying from textile apparel to tire cord and other heavy industrial types.

Other advantages claimed for the machine follow: (1) requires less capital investment because it eliminates several conventional processing operations; (2) requires less production cost because of reduced personnel for operation and high quality of product; (3) will spin and process all commercial viscose and cupra yarns ranging from 50-1100 deniers, from low to high tenacity, in all degrees of twist, and in various types of surface finish; (4) gives greater production per spindle; (5) requires less plant space and less time for installation; and (6) gives greater efficiency than conventional methods, resulting in lower cost of finished yarns.

EUROPE

GREAT BRITAIN

Van Rossem's Foundation Lecture

By L. THACKER
Foreign News Editor

The Fifth Foundation Lecture of the Institution of the Rubber Industry, which A. van Rossem, director of the Rubber Research Institute, Delft, Holland, had been invited to give in London on May 10, was attended by a large and appreciative audience. Among those present were colleagues from Holland including Prof. G. van Iterson, Jr., under whom Dr. van Rossem had studied at the Netherlands Government Rubber Institute at Delft; and R. Houwink and R. de Decker, respectively, director general and director of the research department of Rubber Stichting. J. le Bras, director of the Institut Français du Caoutchouc, was also present.

Herbert Rogers, president of the IRI, presided, and supporting him was G. L. Hammond, chairman of the London Section of the Institute. Mr. Rogers formally introduced Dr. van Rossem, whom he regarded as an old and esteemed friend, he said. Dr. van Rossem, who became a member of the IRI in 1927 and was elected a Fellow the same year, had lectured before the Institute in 1924 on the properties and development of the industrial application of rubber latex. His publications on rubber cover a wide field and together with works with coauthors total more than 60 communications.

Dr. van Rossem obtained his doctor's degree in 1916, with a paper entitled "Contribution to the Knowledge of the Vulcanization Process." In that year he was appointed director of the Netherlands Government Rubber Institute and continued as director when the Institute was reorganized in November, 1941, as the Rubber Research Institute, T. N. O. Meantime he had also been appointed director of research of the Rubber Foundation in 1936, an office he held to the end of 1949, when he gave it up. When in 1940 a special Chair of Rubber Chemistry and Technology was created at Delft University, Dr. van Rossem became the first professor.

Dr. van Rossem began his lecture, entitled "Natural Rubber—Its Properties as a Raw Material for the Manufacturing Industry," by briefly reviewing the history of the development of the natural rubber industry and the testing of the quality of natural rubber. The problem of variability is as old as the plantation industry and was discussed at the rubber conferences of 1908, 1911, 1914, and 1921, he recalled. Investigators even then showed that plantation rubber varied as to rate of cure, and that external appearance, the criterion of the market, had no relation whatever to vulcanizing properties.

Both the Experimental Rubber Station at Kuala Lumpur, established in 1913 under B. T. Eaton, and the Central Rubber Institute at Buitenzorg, Java, under O. de Vries, set up in 1916, immediately gave special attention to the preparation of plantation rubber and causes of variability.

Variability is caused by biological factors which can be only partly overcome and chemical factors which play a part during preparation of the rubber and can be eliminated by carefully standardized preparation. Dr. de Vries, in particular, made efforts toward standardization, advocating preparation in central factories and production of certified rubber with standard properties. Planters, however, wanted a premium on certified rubber, which most manufacturers did not care to pay; so this attempt was not very successful.

Dr. van Rossem then summarized the general requirements of rubber manufacturers, already given by Sackett as follows: cleanliness of the rubber, freedom from diluents and deleterious substances, better packing to prevent later contamination with dirt, sand, etc., uniform high plasticity, uniform rate of cure and age resistance.

In Java, the speaker said, a special committee has agreed on the need of centralizing preparation of rubber. Many difficulties exist, however, chief among which is the question of transportation. Then the need and the possibility of establishing central factories will have to be studied separately for each area. In some territories there are estates so large that their factories may be regarded as central factories. On the other hand, there may be in Java estates so widely scattered as to make transportation to a central factory difficult.

Dr. van Rossem then spoke of the French scheme of grading rubber according to Mooney viscosity and rate of cure. The French have already put the scheme in working order, he said,

and are very hopeful of results. Referring to the work published by the BRPRA on testing rubber with the strain tester developed by the United States Bureau of Standards, he pointed to the obvious need of all institutes to adopt the same testing methods and grading systems.

The discussion next turned to possible new methods of preparation, summarized as follows:

1. Methods which aim at reducing variability of the rate of cure by recoagulation or separation of the yellow fraction, or by addition of soaps for displacement and subsequent elimination of the proteins by centrifuging or creaming.

2. Continuous preparation of rubber, which includes accelerated coagulation (within 30 seconds) by addition of soaps and acid to the latex on a conveyer belt which brings coagulum to the washing battery or the sheeting machinery.

3. Flocculation processes like that of the U. S. F. rubber in which formaldehyde is added to the latex, the mix is allowed to stand 48 hours; then acid is added, resulting in a flocculate which comes to the surface, is washed, and processed into crepe or sheet.

For special purposes, natural rubber lags behind the new synthetic rubbers, for instance, of the nitrile type for oil resistance, and the Butyl type, which is highly impermeable to air. The lecturer considered that there was little chance that chemical modification of natural rubber would yield products capable of competing in these respects. Our knowledge of the molecular reasons for these special properties is now so far advanced that we know exactly, on paper, how the rubber should be modified, but our present knowledge of organic chemistry does not permit the actual modification to be carried out.

Dr. van Rossem pointed out that the future of natural rubber depends not only on its properties, but also on price and general politics. Modern planting material is expected to produce 1,800 pounds an acre, against 500 pounds, considered good in the old days, which yield does result in considerably lower tapping costs, but wages of native workers have risen and may make total costs prohibitive in competition with synthetic rubber. The future of natural rubber is closely linked to the political situation in the Far East; if banditry increases and chaos develops, the rubber industry will gradually be abandoned, but with peace and lower costs and uniform rubber prepared in central factories, the future of the natural rubber industry seems assured.

Those plantations or areas of native rubber industry of small output per acre, of large variability, or too high in cost will gradually disappear, the lecturer said. Most of the measures to be taken for the future development of the natural rubber industry depend on reorganization and cooperation more than on research, he added.

He concluded with an expression of faith in natural rubber. Unlike most people, he declared, he is a firm believer in the plant as a chemical factory. The manufacture of synthetic rubber from coal or petroleum, he went on, is a trespass on the accumulated solar energy of the past, which cannot continue *ad infinitum*. But the latex tapped today is the result of solar energy of yesterday, perhaps of last month, and when we consider this point, "We should keep our friend *Hevea brasiliensis* in high esteem."

British Industries Fair

By L. THACKER

LONDON, May 11—The British Industries Fair, held in Birmingham and London, May 8-15, featured many exhibits of rubber and plastics goods manufacturers. In Birmingham the exhibits were centered at Castle Bromwich, not far distant from the Fort Dunlop plant of Dunlop Rubber Co., Ltd., and in London the exhibits were housed, as usual, in the buildings known as Olympia and Earl's Court, respectively.

Exhibits at Castle Bromwich

Although tires had already been shown at various other exhibitions not long ago, it was immediately evident that much of the equipment displayed at the outdoor stands at Castle Bromwich was provided with pneumatic tires. Included were field and garden tractors and cultivators and scythes, by Allen & Simmonds, Ltd.; bulldozers and scrapers, by Birtly Co., Ltd., which manufactures these items under license from Caterpillar Tractor Co., Peoria, Ill., U.S.A.; farm and agricultural equipment (Rubber Products, Ltd.); mobile mechanical shovels (Chaseside Engineering Co., Ltd.); cultivators with various attachments including ploughs, sprayers, mowers, etc. (Clifford Aero & Auto, Ltd.); hedge cutters and mobile safety saws equipped with large pneumatic tires (John Allen & Sons, Ltd.). Decel Engineers, Ltd., introduced a new labor-saving loader conveyer fitted with four-ply rubber-covered canvas belt, weigh-

ing only 850 pounds, easily moved by one man and capable of handling bags and boxes up to 200 pounds.

Among the firms inside the Fair buildings were: British Tire & Rubber Co., and affiliated companies, with displays of belting, anti-vibration mountings, rubber-to-metal parts, rubber-lined bearings, surgical tubing, X-ray gloves, aprons, hospital sheeting, printers' rolls, etc.; J. H. Fenner & Co., Ltd., with Resilla Bond anti-vibration mountings and flexible couplings and Resilla rubber rollers, V-belts, disks, pulleys; Goodyear Tire & Rubber Co. (Great Britain), Ltd., with hose, rubber conveyer and transmission belting, endless cord belts; David Moseley & Sons, Ltd., belting and gloves, surgical supplies, thread, billiard cushion rubber and tobacco pouches; North British Rubber Co., Ltd., all kinds of mechanical goods, also flooring in sheet and tile form, and rubber flooring; Northern Rubber Co., Ltd., mechanical rubber goods for the chemical, aircraft, and automotive industries, made of all kinds of synthetic rubber as well as natural rubber; Rediern's Rubber Works, Ltd., rubber and ebonite linings, flooring and matting, and bristle setting compounds. Flooring was shown by various other companies including Rubberware, Ltd., which makes coverings six feet wide as well as tiles; this company also exhibited rubber aprons and natural and synthetic rubber sheeting. James Walker & Co. also used synthetic rubber as well as natural rubber in packings and jointings.

Dunlop displayed large rubber-covered printing rolls, belting in one section, and a colorful rubber tile floor covering that attracted much attention. On one side of this stand was a small piece of rubber flooring which had an underlay of sponge rubber.

At the Dunlop Special Products, Ltd., stand were found the so called C-type anti-vibration mountings specially designed for machinery of medium weight, delicate instruments, control panels, and precision machines. This type of mounting, claimed to provide simple yet highly efficient and economic insulating means, measures 2 11/16 inches at its greatest width and 1 21/32 inches at its greatest height; rubber elements are bonded to a rigid metal outer frame and a center channel bolted direct to the machine. The rubber elements are produced in a range of compounds permitting loads up to 150 pounds per mount, and the number of mounts and appropriate compounds are selected as required. There were also barrel-type flexible couplings for axial and parallel connections consisting of an element of rubber stressed in shear and bonded between metal flanges; also disk couplings. Finally there was a range of silicone rubber products which this company now produces in the form of molded sheets 1/16-to $^{5}/_{8}$-inch thick; also gaskets, sealing and packing rings, extrusions, various molded articles, glass cloth impregnated with silicone rubber, and long lengths of this rubber.

Wilkinson Rubber Linatex, Ltd., featured a Linatex ball mill constructed along new lines. Two circular metal end-plates, protected internally with Linatex rubber (95% natural rubber sheet compound prepared from the company's own plantation rubber in Malaya), are connected throughout their circumference by securing rods over which are threaded substantial rings of Linatex rubber held in compression by the final bolting together of the end-plates. A Linatex handhole or detachable end plate, depending on the model, insures complete protection of all metal parts from the contents of the mill and at the same time prevents metallic contamination of the charge. Three types of Linatex ball mills are supplied for various requirements. It is claimed that the mill will grind most substances efficiently except

SEE PAGE 382

where certain oils or solvents harmful to the rubber are used. There is also a Linatex pump in which the materials being pumped are protected from the metal of the pump by rubber lining. Corrosion resistant linings, anti-vibration mountings, protective garments, and tank seals are also included in the Wilkinson display. Linatex strip is used for "knock-out" windows in aircraft, etc. This company is also using synthetic rubber and plastic materials in the manufacture of hose.

Various other companies now processing thermoplastics in addition to rubber, besides Wilkinson, include Ioco Ltd., exhibiting synthetic bonded laminates, wall boards, insulating tapes, and Silopex woven glass fabric impregnated with silicone varnish; George Angus & Co., Ltd., which showed polyvinyl chloride gloves and mitts, and oil seals of Gaco, a synthetic material about which nothing could be learned except that it is oil and heat-resisting, has rubber-like physical properties, and is obtainable in various grades for various purposes; and Hall & Hall Ltd., who make "Hallprene" synthetic rubber moldings, sheetings, extrusions and oil seals, besides natural rubber mechanical goods.

Dunlop's manufactures from plastics were mainly shown in London.

On the whole there seemed to be considerable interest among manufacturers of plastic materials and articles from plastics in the development of PVC and polyethylene. Bakelite, Ltd., is putting out a line of "Vyback" PVC plastics, which includes compounds for cable coverings, injection molding, extrusions, coating of cloth, and the manufacture of flexible and rigid sheets. The De La Rue companies, also represented at Earl's Court, London, featured among others, rigid polystyrene, polyethylene and PVC extrusions and flexible PVC compounds; also plastic tiles and flooring. Chemical Pipe & Vessel Co., Ltd., presented hot gas molded polyethylene valves, pipe fittings and pipes, as well as tank linings in polyethylene and PVC. Prodorite also had acid proof plastic tank linings and pipe lines.

The products of members of the Cable Makers Association were shown at two stands, but several members had separate displays as well. Polyethylene and PVC insulations were shown by Telegraph Construction & Maintenance Co.; Sterling Cable Co., Ltd., also included rubber and plastic insulated products.

Of the firms showing machinery for the rubber and plastics industries may be mentioned Finney Presses, Ltd., T. H. & J. Daniels, Ltd., George Cohen & Sons, Ltd., William Frost Products, Ltd., Radio Heaters, Ltd., and Rockweld, Ltd. Schori Metallizing Process, Ltd., demonstrated flame spraying of plastics for protecting chemical plant structures.

Rubber Goods at Olympia and Earl's Court

The British Industries Fair in London had most of the general rubber manufactures at Olympia. Transportation between the two buildings, some distance apart, was provided free by the management of the Fair.

Cannon Rubber Manufacturers, Ltd., featured its new self-sealing hot water bottles, made all in one piece and provided with a new type of rubber stopper for which it was claimed "the greater the strain, the greater the grip." For children the company also showed animal hot water bottles of the Noah's Ark series.

P. B. Cow, Ltd., exhibited its Li-lo sporting, surgical and household rubber goods, which now include water wings, a new beach ball, and a new compact "Travelette Douche." North British Rubber was represented by a good selection of surgical rubber goods and druggists' sundries. At the stand of G. J. Ingram & Sons, Ltd., were to be seen, besides sporting goods, high-grade surgical supplies including fabric reinforced hot water bottles said to give good service for ten years or more.

Sporting goods were also displayed by Avon India Rubber Co., Ltd., Geo. Spencer Moulton & Co., and Spalding. The latter offered the "As-U-Wer" golf practice mat made of rubber about nine by 23 inches in size. The mat is serrated on the underside and has attached to its forward end a hollow rubber ball held by a tubular rubber cord which fits in a channel running under the whole length of the mat and is secured at the rear end. When the ball is hit, the cord draws it back to the tee'd position, hence the name.

The Dunlop group was represented at three stands at Olympia at which sporting goods, druggists' sundries, including attractive dolls, toys, and animal hot water bottles for children, were reviewed. Among the toys, the manufacture of which had been taken over from the Playlastic Co. by Dunlop, were colorful boy and girl dolls in dress and posture appropriate for different sports and games; some of these, as well as some of the animal and bird toys, were on rockers; there were also "Velveny" bunnies of rubber on to which suedette had been blown, giving the toys a pleasant velvety feel.

A variety of amusing balloons, molded rubber figures, and squawking toys of rubber or plastic, also rubber and plastic dolls

were shown by a number of companies, including Lea Bridge Rubber Works, Ltd., "R" Process British Rubber, Grovewell Ltd., Webber Dolls, Ltd.; Portslade By-Products had among its exhibits a little rubber diver which by pressure on a rubber bulb at the end of a length of tubing communicating with the body could be made sink and rise at will. Premo Rubber Co., Ltd., again showed its Minibrix building sets including all-rubber bricks, balustrades, doors, roofs and windows, colored in red, white, black, or green. The concern has added Tudor Minibrix with which old-world Tudor cottages as well as historical Tudor and Elizabethan buildings can be constructed.

Less rubber was shown at Earl's Court, but Dunlopillo mattresses and cushions attracted attention at one of the Dunlop stands, and similar lines of latex foam rubber products by Vitafoam, Ltd., were also evident.

Most of the manufacturers of plastics and plastics goods were exhibited at Earl's court. British Geon, Ltd., featured Geon and Breon polyvinyl resins, latices, compounds, and pastes for a wide variety of purposes; while British Resin Products, Ltd., showed Cellomold and Rockite molding powder and Epok and Cellobond synthetic resins and adhesives.

Imperial Chemical Industries, Ltd., which also had a stand in Birmingham, displayed plain and corrogated Perspex, Diakon acrylic molding powders, "Corvic" PVC polymer in various grades for use in calendering, extrusion, cable sheathing; plasticized PVC compositions, rigid PVC sheet for lining tanks and making plant components; polyethylene for piping for various uses, also for making collapsible tubes for cosmetics, etc.; Alkathene film, nylon for injection molded sleeves and bearings, Fluon for packaging.

Vinyl Products, Ltd., featured its Vinamold Hot Melt Compounds, vinyl casting resins for making flexible molds for casting plaster of paris, thermosetting resins, wax, etc. It was claimed that Vinamold, produced in five grades, ranging from very hard to very soft, retains its shape up to 80° C., can be used repeatedly, is unaffected by water, many chemicals, and most solvents, and permits reproduction of the finest details. Dunlop showed vinyl resin-based products marketed under the name Fortiflex and including calendered, press molded, and embossed sheetings, special moldings and extrusions, sheeting for garments, upholstery, tank linings, and flooring. "Phenco" vinyl continuous flooring and pressed tiles were shown by the Phoenix Rubber Co., Ltd. P. B. Cow, another rubber company active in the plastics field, showed toys, games, plain and printed sheetings, moldings for industry, all of plastic.

Leather-grained PVC sheeting was displayed by Duraplex Plastics, Ltd., and Wallington, Weston & Co., Ltd. The latter company, which includes Frome Plastics, Ltd., had on view besides the Frome Tan plastic sheeting with leather-like finish, Fromocene that looked like silk and is claimed to have good draping qualities, and Fromoprene insulation materials. Fromoprene is a laminate combination of plastic materials and synthetic rubber developed during the war to meet demands of the services in the Far East.

Protective gloves and clothing of PVC for workers were offered by some firms, including James North & Son, Ltd.

UNION OF SOUTH AFRICA

The British Rubber Development Board recently established the Natural Rubber Bureau in Cape Town, under A. MacDonald, who was scheduled to take up his duties in April after completing an extensive tour of the Union of South Africa during which he was to visit all the important local rubber manufacturers.

A considerable amount of conveyer belting is used in the South African mines, some of them being equipped with conveyer systems requiring extra-long belting. Recently Goodyear Rubber Co., Ltd., reportedly installed what is considered to be the longest single belt in South Africa. The belt, which operates at a depth of 1,350 feet in a diamond mine at Jagersfontein, is 2,210 feet long and 42 inches wide and can convey 700 tons of soil an hour over a distance of 1,095 feet. The belt was brought to its underground destination in five pieces and there joined into a single, continuous whole with the aid of a portable vulcanizing press.

Another long conveyer belt, (1,580 feet) is in use at the Witbank colliery. The Roan Antelope copper mine in Northern Rhodesia has a conveyer system employing 14,717 feet of belting.

The Firestone Tire Co., Port Elizabeth, recently imported two 19-ton presses for use in the manufacture of tires with a diameter of about six feet to meet the increasing local demand for giant sized tires.

Editor's Book Table

BOOK REVIEWS

"Elastomers and Plastomers; Their Chemistry, Physics, and Technology. Volume I. General Theory." Edited by R. Houwink. Elsevier Publishing Co., Inc., 215 Fourth Ave., New York 3, N. Y. Cloth, 6¾ by 10 inches, 509 pages. Price, $7.

This volume, the last to be published, completes the series of three books; Volume II covered manufacture, properties, and applications; while Volume III covered testing and analysis, and tabulation of properties. Volume I provides a wealth of information on theoretical aspects of high polymer chemistry and physics. There are 10 chapters contributed by authorities in the field, and each chapter includes an extensive bibliography of references. Although the latest references are in 1948, the value of this work, particularly in combination with the other two volumes, will be evident to all students in the field of high polymers.

Chapters and their contributors follow: "Economic Aspects," H. A. Frank; "Organic Chemistry," C. Koningsberger; "Reaction Kinetics and Mechanism of Polyreactions," H. Wechsler, W. P. Hohenstein, and H. Mark; "Molecular Constitution," "Mechanical Properties," "Physics and Structure," G. J. van Amerongen; "Electrophysics," L. Hartshorn; "Mechanical Operations," H. Gibello; "Polymer-Liquid Interaction," van Amerongen; and "Plasticizers," R. S. Colborne.

"A New Dictionary of Chemistry." Second Edition. Edited by Stephen and L. Mackenzie Miall. Longmans, Green & Co., Inc., 55 Fifth Ave., New York 3, N. Y. Cloth, 6 by 9 inches, 598 pages. Price, $12.

Intended as a handy reference work for chemists and other persons interested in general chemical matters, this dictionary gives concise explanations of chemical and chemical engineering terms; the structure, preparation, and uses of chemical and biochemical substances; chemical operations; and biographies of leading chemists. All articles are written by leading authorities in the field, and the material has been revised since the first edition (1940) to bring it up to date. By providing in one volume of moderate size a mass of miscellaneous chemical information, this dictionary will be of great value as a supplement to the standard chemical texts.

"World Chemical Directory, 1949." Published by World Chemical Directory, 425 W. 25th St., New York 1, N. Y. Cloth, 6 by 9 inches, 702 pages. Price, $10.

This directory, printed in English, French, and Spanish, lists more than 18,000 firms located all over the world that are importers, exporters, or manufacturers of chemicals, plastics, drugs, and oils. The book is divided into four parts. The first is a commodity index. The second section lists all commodities alphabetically and gives the name and address of each firm handling that particular commodity. A geographical listing by countries and cities is given in the third section, with products and type of business shown for each company. The concluding section is an alphabetical listing of brand and trade names with their manufacturers. The directory will be revised annually, and future editions will also include a special section devoted to tariffs on chemicals, drugs, oils, and plastics.

NEW PUBLICATIONS

"This Is Du Pont—The Story of Cellophane." E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 24 pages. This booklet provides a pictorial record of the history of cellophane and its effect on the American scene. Manufacturing operations are shown, typical applications mentioned, and the effect of cellophane on other industries described in detail. Consumer uses are depicted by means of stories and photographs showing use of cellophane by typical families.

"Du Pont Cordura High Tenacity Rayon." 12 pages. This illustrated booklet describes the manufacture of Cordura rayon fiber; its properties in comparison to cotton; typical applications, including tires, conveyer belts, and hose; and the cost advantages inherent in the fiber's strength and light weight.

"Baldwin Sonntag 60,000 Pounds Capacity Universal Testing Machine—Model 60-H." Bulletin 310. Baldwin Locomotive Works, Philadelphia 42, Pa. 4 pages. The new Sonntag machine described in this bulletin is designed to fill the need of a low-cost universal tester. Specifications are given together with information and illustrations on the design of the machine, loading system, and accessories available.

"Desirability of Mixing Hi-Sil Compounds in the Banbury." Pigment Data Bulletin 50-4, May, 1950. Pittsburgh Plate Glass Co., Columbia Chemical Division, Fifth Ave. at Bellefield, Pittsburgh 13, Pa. 4 pages. Data show that Hi-Sil batches should be mixed in a Banbury in preference to a roll mill. If a roll mill is used, the batch should be mixed and taken off as quickly as possible to avoid degradation of the compound.

"Indonex Plasticizers in Polyacrylic Rubbers." Circular No. 13-40, June 1, 1950. Indoil Chemical Co., 910 S. Michigan Ave., Chicago 80, Ill. 5 pages. Indonex plasticizers are stable at the elevated temperatures used in service of polyacrylic rubbers and do not react with the curatives required for these compounds. This bulletin gives laboratory test data on Hycar PA-21 stocks showing the suitability of Indonex 634½ as a plasticizer.

"Titanox Pigments—Properties and Uses." Titanium Pigment Corp., 111 Broadway, New York 6, N. Y. 66 pages. This illustrated booklet describes the types of Titanox pigments currently available, gives information on their fundamental and technical properties, and discusses their selection and use in different types of products, including rubber, plastics, floor coverings, paints and coatings, paper, and other.

"Purecal in Natural Rubber." Bulletin No. R-1. Wyandotte Chemicals Corp., Wyandotte, Mich. 42 pages. This handsome illustrated booklet, the company's first publication for the rubber industry, presents extensive information and test data on the use of the three grades of Purecal precipitated calcium carbonate in natural rubber. Tables and graphs show the effect of Purecal loadings on properties of the rubber compound; while others compare results obtained with those of other non-black fillers. The concluding section gives recommended formulations for producing various types of natural rubber stocks employing Purecal.

Bulletins of Johnson Corp., Three Rivers, Mich. **"The Johnson Electrap."** Bulletin ET. 4 pages. **"Johnson Direct Operated Solenoid Valves."** Bulletin V. 8 pages. These illustrated publications give design data, specifications, directions on operation and installation, and information on typical applications of the company's electrically operated return trap and direct operating solenoid valves for automatic or remote flow control.

"The Paraplex 'P' Series Resins." Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa. 24 pages. This booklet gives complete data on the Paraplex "P" resins, solutions of polyester resins in styrene, for use in laminating, molding, potting, and casting. Properties of Paraplex P-43, P-43HV, and P-13 are given, together with information on processing and applications.

"HI-TAC Latex Adhesives for Rayon and Nylon Treatment." General Tire & Rubber Co., Akron, O. 4 pages. This bulletin gives information on two new HI-TAC latex adhesives recommended for treating cord or fabric to be used in the manufacture of tires, belting, hose, and other rubber-fabric products. Resin and latex dip preparation is described, and data are given on results obtained on a single-cord H-type adhesion test.

"Hazacord Flexible Cords and Portable Cables." Bulletin H-420. Hazard Insulated Wire Works, Division of Okonite Co., Wilkes-Barre, Pa. 56 pages. This illustrated manual on Hazacord cords and cables offers complete technical information and dimensional data on the entire line. Constructions of the various cables are discussed in detail, and typical test values appear for the insulations and sheaths. Methods of splicing the various cables are described and illustrated, and tables show current carrying capacities, resistance values, and their correction factors. Photographs of research and manufacturing methods are also included, together with typical applications.

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SEE PAGE 382

Market Reviews

CRUDE RUBBER

Commodity Exchange

WEEK-END CLOSING PRICES

Futures	April 29	May 27	June 3	June 10	June 17	June 24
Aug.	23.80	29.65	30.10	31.00	27.40	26.10
Oct.	22.85	28.01	28.46	29.45	25.91	24.59
Dec.	22.20	26.80	27.20	28.35	25.15	23.75
Feb.	21.70	25.95	26.15	27.45	24.25	22.92
Apr.	21.45	25.22	25.32	26.67	23.47	22.17
June	21.35	24.50	24.60	25.95	22.75	21.45
Total weekly sales, tons	5,660	9,310	10,250	9,270	11,890	8,930

THE expected break in the rubber market came early in June as futures prices fell approximately 5¢ a pound. The basic factor behind the decline was said to be an improvement in the tight supply situation. The high price level served to uncover considerable amounts of Far Eastern rubber and spurred synthetic rubber production in this country. The agreement between synthetic rubber manufacturers to reduce the styrene content of GR-S from 30 to 25% acted as the trigger for the price break. This change can increase GR-S production by 69,000 tons a year without opening any new plants. The switchover can be accomplished immediately and is the main reason for the sharp increase in rated GR-S production for July.

The United States State Department warning to natural rubber producers that continued sharp increases in crude rubber prices may lead to decreased demand in this country acted as a finishing touch to the bearish factors influencing the market, since the decline had begun before the statement was issued on June 9. Most market observers look for another price decline as the supply situation continues to loosen up.

A major factor in the expected increase in supply is the Indonesian export tax to be imposed from July 1 to August 31. This tax is based on the price of rubber during the previous quarter, and Indonesian exporters are attempting to move their stocks before the tax becomes effective. Although it is doubtful that much rubber can be shipped to American or European markets prior to July 1 because of insufficient shipping facilities, large quantities of Indonesian rubber are expected to reach Singapore before the deadline. Trade sources expect that imports to Singapore will show a sharp increase for this period.

Although the market was thinner and more restrained after the break in prices, the wild fluctuations of rubber futures during May resulted in the board of governors of the Commodity Exchange raising original margins on contracts on June 2. The margin on non-hedge transactions was raised from $600 to $900 per contract; hedge transaction margins were increased from $500 to $750 per contract; and margins on straddle transactions were raised from $200 to $250 per contract.

August futures started the month at 20.90¢, rose to a high of 32.35¢ on June 6, fell off to 31.00¢ on June 9, then broke and dropped to 29.00¢ on June 12 and 27.00¢ on June 13. Prices held at the 27.00-27.50¢ level for the next week of trading, then rose again to end the month at 29.00¢. Trading was active, and the selling waves resulted in a total sales volume for the month of 41,340 tons, as compared with 36,350 tons sold during May.

New York Outside Market

WEEK-END CLOSING PRICES

	April 29	May 27	June 3	June 10	June 17	June 24
No. 1 R.S.S.:						
Spot	24.75	30.88	32.00	32.75	29.00	28.25
July	24.25	30.50	31.50	32.13	28.75	27.50
Aug.	23.38	30.00	31.00	31.13	27.75	26.25
Sept.	23.38	29.00	30.00	30.13	26.75	25.25
Oct.-Dec.	22.75	28.50	28.50	29.13	26.00	24.50
No. 3 R. S. S.	23.75	29.50	30.50	31.50	28.00	27.25
No. 2 Brown	22.00	27.00	28.50	29.00	25.25	24.25
Flat Bark	20.00	24.50	26.00	26.50	23.50	22.50

THE break in physical rubber prices on the New York Outside Market resulted in a brief, but heavy volume of purchasing by manufacturers to meet their immediate needs. After this spurt, trading fell off as factories backed away from the market to await still lower prices. As noted in the futures market report, the outlook is for further price declines in the face of increased shipments from the Far East and higher volume of synthetic rubber production. Toward the end of June, receipts of rubber were in excess of factory demand, and some brokers reported that offers were being returned.

No. 1 sheets started the month at a spot price of 33.75¢, reached a high of 34.00¢ on June 6, then fell off slowly to 32.75¢ on June 9. With the break in the market, the spot price dropped to 28.50¢ on June 12, recovered to fluctuate around the 29.00¢ level for the next week, then rose again to end the month at 31.25¢. No. 3 sheets dropped from 32.50 to 27.50¢ and closed the month at 30.25¢. No. 2 Brown fell from 30.25 to 25.25¢ and was quoted at 25.75¢ on June 30; while Flat Bark declined from 27.75 to 23.25¢.

Latices

A RECENT estimate of domestic supplies and consumption of *Hevea* latex indicates that inventories may be drawn on through September, according to Arthur Nolan, writing in the June issue of *Natural Rubber News*. Estimated receipts of latex are lower than estimated consumption during that period. It is expected that numerous latex consuming plants, aware of their limited supplies through the summer, may shut down for vacations during July. A reduction in July consumption resulting from such shut-downs may result in stocks hovering at the 4,000-ton level in September, provided consumption during May, June, and August does not exceed the 4,300-ton figure of March.

Mr. Nolan gives estimated April *Hevea* latex imports as 4,395 long tons, dry weight; consumption, 3,975 long tons; and month-end stocks, 5,063 long tons. The lower consumption in April, as compared with the March total, is believed due to late arrival of some receipts that prevented their use during April.

The large, reputable importers are said to be endeavoring to discourage black marketing of concentrated *Hevea* latex, and the quantities they are able to sell are offered at a 7.5¢ a pound differential over No. 1 Smoked Sheet for tank car delivery. Carload quantities of drummed concentrate are selling at a differential of 11.5¢ a pound over No. 1 sheets; while less-carload quantities are priced slightly higher. Lower latex prices are expected to prevail later in the year, and numerous buyers of latex are hedging their present purchases with a "short" sale of a comparable quantity of smoked sheet.

The GR-S latex situation is tight, with no immediate expectancy of additional substantial supplies becoming available. Smaller users of high solids type of GR-S latex are facing a severe shortage of supplies. Rubber Reserve is said to be endeavoring to keep its customers of record supplied with GR-S latex and not making commitments with new buyers. Hardships have arisen, therefore, and Rubber Reserve has set up a committee to alleviate distress among the smaller users. May production of GR-S latex was 2,878 long tons, dry weight, and prices remain at the 18.5-20.25¢ per pound level.

RECLAIMED RUBBER

THE recent high crude rubber prices, coupled with the boom in the tire and automotive rubber industry, resulted last month in a sharp increase in demand for reclaim. The first upswing came late in May, and indications were that production and sales reclaim would reach new highs during June. Some reclaim plants were reported to be on a six-day-week basis as manufacturers attempted to satisfy demand. The boom is expected to last at least a few months, especially since the automotive industry anticipates excellent business throughout this year.

The high demand for reclaim and rising prices for scrap rubber, as reclaimers hastily began to rebuild their stocks, resulted in price advances on reclaims. A few increases were reported during June, and others are expected July 1. Whole tire reclaims are expected to advance ½¢ a pound, with a larger increase for inner tube reclaims. The new reclaim prices will appear in our next issue.

Final March and preliminary April statistics on the domestic reclaimed rubber industry are now available. March production totaled 23,037 long tons; imports, 100 long tons; consumption, 22,151 long tons; exports, 988 long tons; and month-end stocks, 27,602 long tons. Preliminary figures for April give a production of 22,671 long tons; consumption, 21,463 long tons; exports, 982 long tons; and month-end stocks, 28,189 long tons.

Reclaimed Rubber Prices

	Sp. Gr.	¢ per Lb.
Whole tire	1.18-1.20	8.25/ 8.75
Peel	1.18-1.20	8.25/ 9.25
Inner tube		
Black	1.20-1.22	11.50/12.50
Red	1.20-1.22	14 /14.5
GR-S	1.18-1.20	9.5 /10
Butyl	1.16-1.18	8.5 / 9
Shoe	1.50-1.52	8.25/ 8.75

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

SCRAP RUBBER

THE advance in the crude rubber market was finally reflected in a strong demand for scrap rubber during June as reclaimers placed large orders to meet their needs. Most interest was in mixed tires, which rose from $12 to $15 a ton in the East and from $15 to $17 a ton at Akron. The demand for tubes also resulted in price increases, with red passenger tubes rising from 7.5¢ to 8.0¢ a pound in the East and at Akron. Black tubes rose from 4.5¢ a pound in the East and 3.5¢ a pound at Akron to a uniform price of 5.0¢ a pound. Demand for peelings continued to be only moderate, and no changes occurred in their prices.

Export of scrap was reported to have dropped off last month. Shipments to Spain have dwindled to a few specialty grades, and only small purchases by France and Belgium were said to have taken place.

Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$15.00	$17.00
Peelings, No. 1	50.00	50.00
3	30.00	30.00
	(¢ per Lb.)	
Black inner tubes	5.00	5.00
Red passenger tubes	8.00	8.00

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	April 29	May 27	June 3	June 10	June 17	June 24
Oct.	31.77	31.88	32.79	33.49	32.60	32.76
Dec.	31.62	31.80	32.68	33.43	32.55	32.62
Mar.	31.67	31.80	32.65	33.41	32.54	32.68
May	31.64	31.76	32.60	33.38	32.51	32.63
July	31.40	31.31	32.20	33.06	32.24	32.40
Oct.	29.84	29.80	30.63	31.64	30.74	30.85

COTTON prices again showed gains on the New York Cotton Exchange during June as the result of persistent trade buying of nearby deliveries against mill activity, short covering and commission house buying of more distant positions, and generally unfavorable reports from the cotton growing areas. Evidence of the tightening position of cotton was given by the narrowing of new crop discounts against old-crop July.

Export business continued at a high level, with exports through June 22 totaling 5,090,986 bales, as compared with 4,366,557 bales for the same period last year. Domestic consumption of cotton during the full current season is now estimated at about 8,850,000 bales, and exports are expected to reach 5,300,000 bales. Allowing an estimated 50,000 bales for cotton destroyed during the season, a full season distribution of about 14,200,000 bales is in prospect. With the supply estimated at 21,500,000 bales, a domestic carry-over of fall cottons on July 31 of about 7,300,000 bales appears likely. The carry-over last year was 5,287,000 bales.

The 15/16-inch middling spot price started the month at 34.50¢, rose to 34.81¢ on June 13, fell off during the next week, then advanced to a high of 34.83¢ on June 29, and closed the month at 34.79¢. Futures prices moved similarly; October futures began at 32.51¢ on June 1, reached 33.49¢ on June 9, and closed the month at 33.08¢.

Fabrics

Strong sales trends in all segments of the industrial gray goods market were in evidence during June, and price rises took place on chafers, belting ducks, and coating fabrics. The latter were very active, with orders placed as far ahead as September. Chafers, army ducks, and belting ducks were booked heavily through August at most mills, and wide ducks moved through July and August. Wide drills were in active demand and scarce through the third quarter; while sateens sold strongly into September. Osnaburgs picked up in demand and sold into August in late trading. Sales of sheetings moved briskly at firmer prices, particularly for spot and nearby deliveries. Print cloths recorded their heaviest sales in months as purchasers moved to offset a possible price advance.

Prices of chafer fabrics and hose and belting ducks advanced 2¢ a pound in all constructions; while cotton tire cord prices rose 1¢ a pound. Current prices are:

Cotton Fabrics

Drills		
59-inch 1.85-yd.	yd.	$0.37
2.25-yd.		.32
Ducks		
38-inch 1.84-yd. S. F.	ya.	nom.
2.00-yd. D. F.	yd.	.315 .32
51.5-inch, 1.35-yd. S. F.		.48 1/8
Hose and belting		.61
Osnaburgs		
40-inch 2.11-yd.	yd.	.235
3.65-yd.	yd.	.145
Raincoat Fabrics		
Bombazine, 64x60 5.35-yd.	yd.	.20
Print cloth, 38 1/2 inch, 64x60		.15
Sheeting, 48-inch, 4.17-yd.		.21
52-inch 3.85-yd.		.2225
Chafer Fabrics		
14-oz. sq. yd. Pl.	lb.	.655 .675
11.65-oz. sq. yd. S		.60 .61
10-80-oz. sq. yd. S.		.61
8.9-oz. sq. yd. S		.655
Other Fabrics		
Headlining, 59-inch 1.35 yd-2-ply	yd.	.565
64-inch 1.25-yd. 2-ply		.6063
Sateens, 53-inch 1.32-yd.		.57
58-inch 1.21-yd.		.6238
Tire Cords		
K. P. std., 12-3-3	lb.	.695
12-4-2		.685

RAYON

WORLD production of rayon filament yarn and staple during 1949 totaled 2,704,620,000 pounds, 10% over 1948 production and only 4% below the 1941 all-time high. Filament yarn output last year reached a new record high of 1,641,215,000 pounds, 6% above the previous high in 1948. The viscose process was the most important method used in the manufacture of rayon filament yarn in 1949, amounting to 1,229,680,000 pounds, or 75% of the world total.

The potential world rayon production capacity is estimated to be about 3,842,855,000 pounds at present. By the end of 1951 an operable capacity of 4,188,940,000 pounds is expected, an increase of 9% over present capacity.

No changes in rayon tire yarn and fabric prices occurred during June, and current prices follow:

Rayon Prices

Tire Yarns		
1100/ 480	$0.55	
1100/ 490	.55	
1150/ 490	.55	
1650/ 720	.54	
1650/ 980	.54	
1900/ 980	.54	
2200/ 960	.53	
2200/ 980	.53	
4400/2934	.55 /	$0.56
Tire Fabrics		
1100/490/2	.67	
1650/980/2	.645 /	.66
2200/980/2	.63	

Compounding Ingredients—Price Changes and Additions

Accelerator-Activators, Inorganic				
Litharge, Eagle	lb.	$0.1375	/	$0.1385
National Lead	lb.	.1375	/	.1385
Red Lead Eagle	lb.	.1475		
National Lead	lb.	.1475		
Accelerator-Activators, Organic				
Emersol 110	lb.	.12	/	.1325
120	lb.	.13	/	.1425
130	lb.	.1525	/	.165
Emery 600	lb.	.1075	/	.135
Colors—White				
Cryptone BT	lb.	.085	/	.095
ZS	lb.	.20	/	.21
Titanox A-168, -LO, -MO	lb.	.195	/	.205
RA, RA-10	lb.	.215	/	.225
RCHT	lb.	.075	/	.08
Zinc oxide:				
Azo ZZZ-11, -44, -55	lb.	.14	/	.15
-66	lb.	.1625	/	.1725
35% leaded	lb.	.1375	/	.1475
Eagle AAA, lead free	lb.	.14	F	.15
5% leaded	lb.	.14		.15
35% leaded	lb.	.1375		.1475
50% leaded	lb.	.13 5/8		.14 5/8
Florence Green Seal	lb.	.1575	/	.1675
Red Seal	lb.	.1525	/	.1625
White Seal	lb.	.1625	/	.1725
Horsehead XX-4, -78	lb.	.14	/	.15
Kadox-15, -17, -22	lb.	.14	/	.15
-25	lb.	.1625	/	.1725
Lehigh, 35% leaded	lb.	.1375	/	.1475
50% leaded	lb.	.13 5/8	/	.14 5/8
Protox-166	lb.	.14	/	.15
Standard, 5% leaded	lb.	.14	/	.15
Fillers, Inert				
Albalith lithopone	lb.	.065	/	.075
Purecal D	ton	45.00	/	52.50
M	ton	40.00	/	52.50
Mold Lubricants				
DC Mold Release Fluid	lb.	4.14	/	6.00
Emulsions 35,-A-B	lb.	1.68	/	3.50
Plasticizers and Softeners				
Emersol 110	lb.	.12	/	.1325
120	lb.	.13	/	.1425
130	lb.	.1525	/	.165
Emery 600	lb.	.1075	/	.135
Piccolastic resins	lb.	.24	/	.29
Reinforcers, Other Than Carbon Blacks				
Calcene T	ton	50.00	/	60.00
Piccolastic resins	lb.	.24	/	.29
Purecal U	ton	105.00	/	125.00
Silene EF	ton	110.00	/	120.00
L	ton	115.00	/	125.00
Retarders				
Retarder PD	lb.	.34	/	.36
Tackifiers				
Piccolastic resins	lb.	.24	/	.29

Special Libraries Association held its forty-first annual convention at Chalfonte-Haddon Hall, Atlantic City, N. J., June 12-16. Included on the program was a symposium, Services and Information Offered by the Various Chemical Associations. Part I was presented by Helen Dikeman, research librarian, plastics division, Monsanto Chemical Co., Springfield, Mass.; while Part III was given by Dorris Hall, research librarian, Firestone Tire & Rubber Co., Akron, O.

United States Imports, Exports, and Reexports of Crude and Manufactured Rubber

	March, 1950	
	Quantity	Value
Exports of Domestic Merchandise		
UNMANUFACTURED, Lbs.		
Chicle and chewing gum bases	267,964	$110,469
Synthetic rubbers: GR-S	191,766	45,653
Butyl	9,050	1,601
Neoprene	633,719	219,198
Nitrile	556,407	260,162
"Thiokol"	2,224	1,324
Polyisobutylene	23,929	7,984
Other	5,743	2,078
Reclaimed rubber	2,213,870	216,926
Scrap rubber	3,285,436	87,515
TOTALS	7,190,108	$952,910
MANUFACTURED		
Rubber cement ..... *gals.*	50,458	$92,073
Rubberized fabric: auto cloth ..... *sq. yds.*	10,637	9,465
Piece goods and hospital sheeting ..... *sq. yds.*	55,448	39,575
Footwear, boots ..... *prs.*	3,066	14,411
Shoes ..... *prs.*	14,076	15,043
Rubber-soled canvas shoes ..... *prs.*	13,150	23,825
Soles ..... *doz. prs.*	19,214	55,505
Heels ..... *doz. prs.*	62,962	51,886
Soling and toplift sheets ..... *lbs.*	182,728	31,884
Gloves and mittens, *doz. prs.*	15,448	50,843
Drug sundries: water bottles and fountain syringes ..... *no.*	42,894	28,168
Other	.....	155,453
Rubber and rubberized clothing	.....	159,612
Toy and novelty balloons	.....	25,512
Erasers ..... *lbs.*	17,926	12,864
Rubber toys and balls	.....	22,821
Hard rubber goods: battery boxes ..... *no.*	27,713	45,294
Other electrical goods, *lbs.*	128,621	114,384
Combs, finished ..... *doz.*	2,941	4,430
Other	.....	8,736
Tires and casings: truck and bus ..... *no.*	66,180	2,553,422
Auto ..... *no.*	29,850	392,116
Aircraft	.....	111,667
Farm tractor, etc. .. *no.*	6,570	205,444
Other off-the-road .. *no.*	2,419	232,887
Bicycle ..... *no.*	9,831	13,212
Motorcycle ..... *no.*	303	2,321
Other ..... *no.*	3,215	36,156
Inner tubes: auto, truck, bus ..... *no.*	51,085	154,813
Other ..... *no.*	10,877	42,848
Solid tires: truck and industrial ..... *no.*	1,721	22,423
Other ..... *lbs.*	5,559	570
Tire repair materials: camelback ..... *lbs.*	145,974	37,507
Other ..... *lbs.*	114,834	98,902
Rubber and friction tape ..... *lbs.*	49,459	35,782
Belting: auto and home ..... *lbs.*	73,595	89,363
Transmission: V-belts *lbs.*	83,283	140,030
Flat belts ..... *lbs.*	47,398	51,758
Other ..... *lbs.*	35,969	36,466
Conveyer and levitator ..... *lbs.*	27,885	25,408
Other ..... *lbs.*	32,222	36,676
Hose and tubing ..... *lbs.*	515,295	349,988
Rubber packing ..... *lbs.*	85,531	84,641
Mats, flooring, tiling .. *lbs.*	558,373	128,337
Thread: bare ..... *lbs.*	12,819	20,262
Textile covered .. *lbs.*	11,074	30,376
Gutta percha manufactures ..... *lbs.*	3,326	4,466
Latex and other compounded rubber for further manufacture ..... *lbs.*	514,773	166,209
Other natural and synthetic rubber manufactures	.....	367,746
TOTALS	.....	$6,453,580
GRAND TOTALS, ALL RUBBER EXPORTS	.....	$7,406,490
Reexports of Foreign Merchandise		
UNMANUFACTURED, Lbs.		
Crude rubber	1,476,221	$326,688
Scrap rubber	10,080	2,470
TOTALS	1,486,301	$329,158
MANUFACTURED		
Rubber toy and novelty balloons	.....	$451
Hose and tubing ..... *lbs.*	1,783	609
Latex and other compounded rubber for further manufacture ..... *lbs.*	3,855	2,046
TOTALS	.....	$3,106
GRAND TOTALS, ALL RUBBER REEXPORTS	.....	$332,264

	March, 1950	
	Quantity	Value
Imports for Consumption of Crude and Manufactured Rubber		
UNMANUFACTURED, Lbs.		
Crude rubber	129,541,568	$21,120,732
Rubber latex	8,175,255	1,826,747
Balata	202,203	66,374
Jelutong or Pontianak	254,199	97,008
Gutta percha	37,265	13,672
Synthetic rubber	5,753,446	968,000
Reclaimed rubber	224,000	6,872
Scrap rubber	2,730,604	83,187
TOTALS	146,918,540	$24,182,592
MANUFACTURED		
Tires: auto, bus, truck *no.*	2,481	$50,312
Bicycle ..... *no.*	500	1,037
Other ..... *no.*	352	436
Inner tubes: auto, etc. *no.*	644	503
Rubber footwear:		
Boots ..... *prs.*	1,671	3,347
Shoes and overshoes *prs.*	1,216	3,043
Rubber-soled canvas shoes ..... *prs.*	592	543
Athletic balls: golf .... *no.*	34,125	6,450
Tennis ..... *no.*	87,994	11,256
Other ..... *no.*	624,576	42,593

	March, 1950	
	Quantity	Valee
Rubber toys, except balloons	.....	52,062
Hard rubber products	.....	2,672
Rubber and cotton packing ..... *lbs.*	748	746
Gaskets and valve packing	.....	2
Molded rubber insulators.	.....	2
Rubber belting ..... *lbs.*	375	308
Hose and tubing	.....	1,337
Drug sundries	.....	1,274
Rubber instruments . *doz.*	120	710
Gutta percha manufactures ..... *lbs.*	226	100
Rubber bands ..... *lbs.*	40	40
Synthetic rubber products	.....	183
Other soft rubber goods ..	.....	61,231
TOTALS	.....	$240,187
GRAND TOTALS, ALL RUBBER IMPORTS .	.....	$24,422,779

SOURCE: Bureau of Census, United States Department of Commerce, Washington, D. C.

United States Rubber Statistics—March, 1950

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month-End
	Production	Imports	Total	Consumption	Exports	Stocks
Natural rubber, total	0	57,831	57,831	56,545	659	97,197
Latex, total	0	3,650	3,650	4,314	0	4,494
Rubber and latex, total	0	61,481	61,481	60,859	659	101,691
Synthetic rubbers, total	*28 337	2,569	35,572	37,647	621	86,824
	†4,666					
GR-S types	*23,765	2,356	26,127	28,594	86	66,380
	†6					
Butyl	*4,572	213	4,785	4,767	4	12,203
Neoprene	†3,516	0	3,516	3,447	283	4,877
Nitrile types	†1,144	0	1,144	839	248	3,364
Natural rubber and latex, and synthetic rubber, total	33,003	64,050	97,053	98,506	1,280	188,515
Reclaimed rubber, total	23,037	100	23,137	22,151	988	27,602
GRAND TOTALS	56,040	64,150	120,190	120,657	2,268	216,117

*Government plant production.
†Private plant production.
SOURCE: Rubber Division, ODC, United States Department of Commerce, Washington, D. C.

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, Inventory, April, March, 1950; First Four Months, 1950-1949

	April, 1950	% of Change from Preceding Month	March, 1950	First Four Months, 1950	First Four Months, 1949
Passenger Casings					
Shipments					
Original equipment	2,648,289		2,484,413	10,771,126	8,307,065
Replacement	3,694,559		3,126,716	11,344,727	10,288,233
Export	53,325		42,445	181,825	159,567
TOTAL	6,396,173	+13.14	5,653,574	22,297,678	18,754,865
Production	6,468,984	+ 4.81	6,172,064	23,957,613	20,660,011
Inventory end of month	10,353,930	+ 0.21	10,332,388	10,353,930	10,705,291
Truck and Bus Casings					
Shipments					
Original equipment	326,615		345,397	1,373,935	1,454,264
Replacement	743,618		731,048	2,524,262	2,109,076
Export	59,156		63,688	252,666	348,286
TOTAL	1,129,389	— 0.94	1,140,133	4,150,863	3,911,626
Production	1,114,443	— 2.44	1,142,326	4,158,183	4,471,447
Inventory end of month	1,986,705	— 1.76	2,022,177	1,986,705	2,485,314
Total Automotive Casings					
Shipments					
Original equipment	2,974,904		2,829,810	12,145,061	9,761,329
Replacement	4,438,177		3,857,764	13,868,989	12,397,309
Export	112,481		106,133	434,491	507,853
TOTAL	7,525,562	+10.77	6,793,707	26,448,541	22,666,491
Production	7,583,427	+ 3.68	7,314,390	28,415,796	25,131,458
Inventory end of month	12,340,635	— 0.11	12,354,565	12,340,635	13,190,605
Passenger and Truck and Bus Tubes					
Shipments					
Original equipment	2,974,646		2,831,078	12,140,292	9,742,123
Replacement	3,050,549		2,841,560	10,363,141	9,609,284
Export	68,774		60,853	245,956	343,980
TOTAL	6,093,696	+ 6.29	5,733,491	22,749,389	19,695,387
Production	6,285,414	+ 1.00	6,223,014	23,940,866	21,752,857
Inventory end of month	11,710,259	+ 2.43	11,432,334	11,710,259	11,747,607

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

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RUBBER CHEMIST: THREE TO FIVE YEARS' LABORATORY or factory experience sole and heel industry or mechanical goods. Send complete resumé with salary desired. Address Box No. 587, care of INDIA RUBBER WORLD.

WANTED: SUPERINTENDENT-CHEMIST, UNDER 40, EXPERIenced with molded rubber parts. Excellent opportunity. Our men know of this ad. Chicago area. Address Box No. 588, care of INDIA RUBBER WORLD.

WANTED: CHEMIST WITH KNOWLEDGE OF COMPOUNDING rubber soles, heels, and mechanical goods for New England plant. Reply giving full particulars to Box No. 592, care of INDIA RUBBER WORLD.

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AVAILABLE AUGUST 1ST GENERAL MANAGER, SMALL rubber plant. Experienced in foam rubber, bonded rubber, and molded rubber products. Address Box No. 584, care of INDIA RUBBER WORLD.

GENERAL MANAGER—GRADUATE CHEMICAL ENGINEER with 24 years' compounding, technical, production, and general management experience in all types of mechanical goods, desires new connections with progressive company. Address Box No. 585, care of INDIA RUBBER WORLD.

WOULD LIKE TO CONVERT MY CONSIDERABLE LABORAtory and shop experience into sales work. Desire opportunity to develop into sales representative, preferably servicing, in the field of adhesives, plasticizers, coating components, coating materials. Naturally good teacher, single, chemist willing travel. Salary commensurate. Address Box No. 596, care of INDIA RUBBER WORLD.

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Address Box 555,
c/o INDIA RUBBER WORLD

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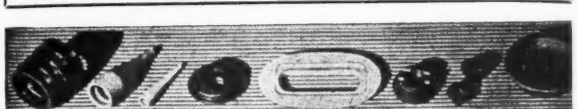

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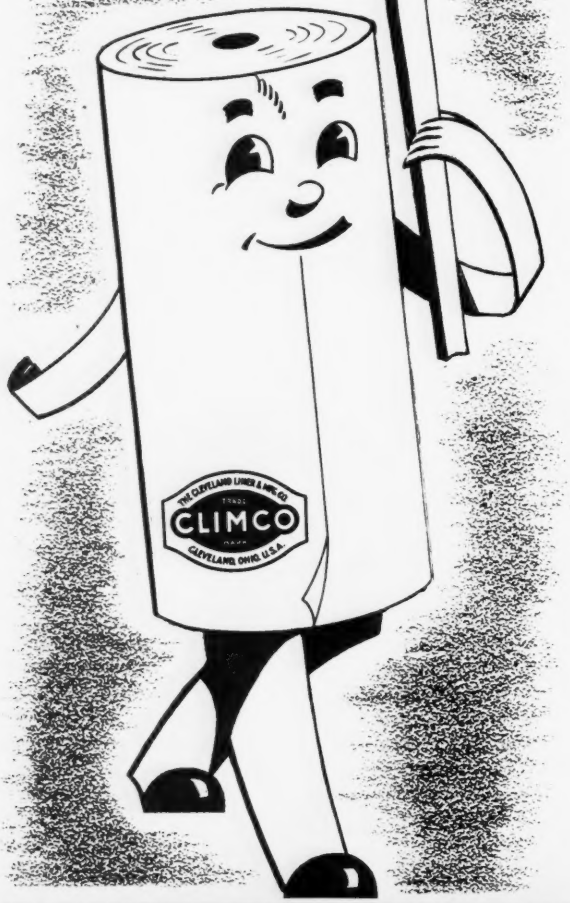

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